C 84709 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Printing Technology

PT 14 705 A—ADVERTISING MANAGEMENT

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. What is the meaning of consumer behavior ?
2. Write notes on the advertiser.
3. Discuss media strategy.
4. Write notes on advertising on the internet.
5. What are the principles of advertising design ?
6. What is the contribution of visual elements in advertising design ?
7. Describe television copy principles.
8. Write notes on direct mail and POP.
9. Discuss the structure of media.
10. Discuss the role of advertising in stimulating attention and facilitating retention.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. Discuss the major institutions involved and their role in the field of advertising management.

Or

12. Explain the legal aspects of advertising.

13. Explain Dagmar model.

Or

14. Discuss media planning concept, media decision tool and media plan strategy.

15. Discuss the physiological measures used to observe reactions to advertisements.

Or

16. Compare the production of print advertising with production of television commercial.

17. Discuss the co-ordination of advertising agencies with other service groups in advertising management.

Or

18. Write notes on :

    i) Co-operative advertising and public relation ; and

    ii) Advertising and product management.

(4 ×15 = 60 marks)

C 84708 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2020

Printing Technology

PT 14 704 D—NEWSPAPER AND PERIODICAL PUBLISHING

Time : Three Hours Maximum : 100 Marks

Part A

Answer **eight** *questions.*

Each question carries 5 *marks.*

1. Discuss 3 commonly used newspaper formats.
2. Define News and explain it briefly.
3. What are the factors to be considered while writing headline?
4. List and explain 4 types of editorial.
5. Discuss the following terms used in layout planning :
   (a) Press layout.
   (b) Make-up.
   (c) Storyboard.
6. Write notes on the following determinants of news ;
   (a) Impact.
   (b) Prominent.
7. Discuss the features of Headlines as a design element for newspaper.
8. Write notes on photo editing.
9. Difference campus and professional magazine.
10. Explain the features of hot-metal composition.

(8 × 5 = 40 marks)

Turn over

Part B

Answer **all** *question.*

Each question carries 15 *marks.*

11. (A) Discuss the various properties to be checked for the incoming raw materials for newspaper production ?

(8 marks)

(B) Discuss how to maintain lean marketing budget for newspaper. (7 marks)

Or

12. With the help of a flow chart, explain the organizational structure of newspaper industry.

13. (A) Explain different stages of layout planning. (10 marks)

(B) Write notes on first proof and paste-up proof. (5 marks)

Or

14. (A) Explain various parts of a newspaper. (7 marks)

(B) Explain the basic approach for creating a graphic design. (8 marks)

15. Explain various steps involved in the process of editing conference proceedings.

Or

16. Discuss various sources of news for newspaper.

17. (A) What are the differences between magazine and newspaper ? Explain. (10 marks)

(B) Which are the 2 major classifications of magazines ? Explain in detail. (5 marks)

Or

18. Write notes on the following :

(i) Printing of magazines.

(ii) Ethics and press freedom.

(iii) Types of typeface.

[4 × 15 = 60 marks]

C 84705 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Printing Technology

PT 14 703—QUALITY CONTROL AND STANDARDIZATION

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Differentiate between Quality assurance and Quality control.
2. How to determine the specifications for printing production process ? Explain.
3. Explain the various elements of a print control strip.
4. A printer wishes to see the effect of different dot shapes on the print quality, printed on different grades of papers. In such case which test target is more suitable ? Discuss the characteristics of such test target.
5. Briefly explain IT 8.7/3 Basic Data Set used in characterization of a Printing Press.
6. What is the significance of having information block in GATF test forme ? Explain.
7. What is the specialty of a Dot size comparator test target ? Explain in detail.
8. In a quality testing process 8 samples were taken from for every hour. The $\bar{x}$ and R values for a particular quality characteristic are determined. After 35 lots of quality test the calculated values for average of $\bar{x}$ = 120 and average of R = 14.56.

   a) What will be the control limits for $\bar{x}$ and R charts ?

   b) Assume that the process is normally distributed. If the specifications are 119 ± 5, what are your conclusions regarding the process ?

9. What is the rule for positioning print control strips in a sheet ? Discuss.

10. In a production line of sheet fed coating machine, the average number of non-conformities per coating machine is estimated to be 45. The quality engineer wishes to establish a C chart for this operation, using an inspection unit of 6 sheet fed coating machines. Find the 3 sigma limits for this chart.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. How do ISO 9000 is benefitted to an organisation ? Explain.

Or

12. Discuss the quality cost categories and their inter-relationship in detail.

13. How do you evaluate grey balance using Gray balance test chart ? Explain the procedure in detail.

Or

14. Which test target is more suitable to analyze the dot reproduction in highlight and shadow areas of an offset plate image carrier ? Explain its design.

15. Explain the importance of followings in a GATF Test form.

    a) Line resolution target; and b) Mottle Patch.

Or

16. Explain the design and evaluation of following test charts of GATF Test forme :

    a) Transfer grids ; and b) Color correction Target.

17. A quality inspection was carried out for 20 lots of weekly magazines, by selecting 25 magazines for each lot. The table gives the number of defects found in each lot under test. Plot a fraction defective chart and determine if the process is in control or not ? If not, revise the control limits and give your conclusions.

Magazine Lot Number	:	1	2	3	4	5	6	7	8	9	10
Number of defects found	:	2	10	7	6	12	5	4	9	12	2

Magazine Lot Number	11	12	13	14	15	16	17	18	19	20
Number of defects found	12	14	1	13	14	12	4	6	7	10

Or

18. The following table gives the data collected for a quality parameter of a product. Construct a X-bar and range chart, if the sample size is 4 then derive a conclusion on these observations :

Sample No.	1	2	3	4	5	6	7	8	9	10
X-bar	5.04	5.24	5.14	5.08	5.28	5.16	5.3	5.1	5.16	5.1

(4 × 15 = 60 marks)

C 84704 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Printing Technology

PT 14 702—PACKAGING TECHNOLOGY

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Discuss the conditions requiring changes in package design.
2. What are the factors to be considered while selecting color of a package ?
3. What are the advantages and applications of expanded polystyrene ?
4. Write notes on product-package relationship.
5. Discuss the properties of glass.
6. Discuss the effect of moisture on wood.
7. Discuss the advantages and disadvantages of Modified Atmospheric packaging.
8. Describe blister packaging and its advantages.
9. Write notes on futuristic trends in packaging.
10. Discuss the legal aspects in packaging.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. Discuss various corrosion preventive methods.

Or

12. A) Explain the properties of cushioning materials. (8 marks)

B) Discuss various markings on package. (7 marks)

Turn over

13. Explain the manufacturing process, properties and applications of aluminium foil.

Or

14. Discuss the advantages, functions and applications of the following plastic substrates :

a) PET ; b) PVC ; and c) LDPE

15. A) Explain different types of cartons. (7 marks)

B) Discuss the classification of corrugated boards. (8 marks)

Or

16. A) Describe vacuum metallization. Explain the process and advantages. (10 marks)

B) Describe drape forming and explain its advantages. (5 marks)

17. A) Explain the process of manufacturing tin-free steel and mention its advantages and disadvantages. (8 marks)

B) Write notes on collapsible tubes and materials used to prepare them. (7 marks)

Or

18. A) Explain purposes and types of labels. (8 marks)

B) Describe Closure. Explain its purposes and 2 types. (7 marks)

[4 × 15 = 60 marks]

C 84703 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2020

Printing Technology

PT 14 701—TONE AND COLOR ANALYSIS

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

1. Write a note on Murray Davis equation and UGRA Fogra Strips used in color management systems.
2. What is white and black point adjustment, explain.
3. What is grey balancing and tone reproduction, explain.
4. What is double diffuse density, explain.
5. Explain print density and its necessity on printed sheets.
6. What is the need of the digital proofing machine color calibration, explain.
7. What are the components which determine the image quality of a color printed sheet?
8. Explain how punch register system is utilized in printing industry.
9. How is Specular reflection different from Diffused reflection, explain.
10. What is GCR and UCR, Explain in detail?

(8 × 5 = 40 marks)

Part B

Answer any **four** *questions.*

1. Explain the difference between the CMYK and RGB Color Gamut.

Or

2. Explain the need of Color Management systems in a printing industry.

Turn over

3. What is trapping, density, and hue error ?

Or

4. Explain the process of printer calibration and Scanner Calibration.

5. Explain the difference between the PMT and the CCD technology available in scanners.

Or

6. What are the factors to be considered in Pre-press and press to obtain high quality print on paper ?

7. Explain in detail the requirement of CMS in electronic publishing.

Or

8. Explain the principles of electronic scanning and also the bit depth and binary resolution.

(4 × 15 = 60 marks)

C 83792 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Printing Technology

PT 14 705A—ADVERTISING MANAGEMENT

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Discuss the role of human needs as a basis for appeals.
2. What is the scope of advertising ?
3. Write notes on media objectives.
4. Compare media strategy and tactics.
5. How to choose color for advertising design ?
6. What are the characteristics of advertising communications ? Explain.
7. Write notes on advertising agencies.
8. What are the principles of advertising design ?
9. Write notes on media buying and scheduling.
10. What are the characteristics of advertising communications ?

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. Discuss the economic and social roles of advertising.

Or

12. Discuss the facilitating institutions and their role in advertising management.

13. Explain various methods of advertising.

Or

14. Explain Dagmar approach for setting advertising objectives.

Turn over

15. Discuss copywriting, illustrating and layout activities involved in advertising development.

Or

16. Explain copy testing criteria and types of copy testing.

17. Discuss the stages of concept, planning, execution and evaluation of the advertising campaign.

Or

18. Discuss the co-ordination of advertising agencies with other service groups in advertising management.

(4 × 15 = 60 marks)

C 84691 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (2014 SCHEME) DEGREE EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC 14 705 (E)—BIOMEDICAL INSTRUMENTATION

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

1. How the equilibrium resting potential is determined using Goldman Equation?
2. Explain normal and abnormal cardiac rhythms.
3. Give the equivalent circuit of a biopotential electrode.
4. In block-diagram form, show the elements required for an automatic indirect system for measuring blood pressure.
5. The chamber plethysmograph has a volume of 200 ml. Calculate the rapid change in tissue volume that produces a 120 Pa change in chamber pressure. Assume an adiabatic process $P(V)^{1.4}$ = constant.
6. State the requirements for respiratory gas flow measurement.
7. With block diagram, explain the working of an asynchronous cardiac pacemaker.
8. What are incubators? explain its significance.
9. Name the three phenomenon that occur when an electric current flows through the biological tissue.
10. Explain skin and body resistance.

(8 × 5 = 40 marks)

Part B

11. (a) Explain in detail about
    (i) Electrocardiogram
    (ii) Electroencephalogram
    (iii) Electromyogram.

(7 + 4 + 4 = 15 marks)

Or

(b) An AgCl surface is grown on an AG electrode by the electrolytic process described in the previous paragraph. The current passing through the cell is measured and recorded during the growth of the AgCl layer and is found to be represented by the equation

$$I = 100 \text{ mA } e^{-t/10s}.$$

(i) if the reaction is allowed to run for a long period of time, so that the current at the end of this period is essentially zero ; how much charge is removed from the battery during this reaction?

(ii) How many grams of AgCl are deposited on the Ag Electrode's surface by this reaction?

(iii) The chloride electrode is now placed into a beaker containing 1 liter of 0.9 molar NaCl solution. How much AgCl will be dissolved?

(3 + 6 + 6 = 15 marks)

12. (a) (i) Compare the transient step and sinusoidal frequency methods for determining the response characteristics of a Catheter Sensor System.

(ii) Explain the indicator dilution method that uses continuous infusion and method that uses Rapid injection.

(6 + 9 = 15 marks)

Or

(b) (i) Explain the working of a continuous wave Doppler flow metre.

(ii) Calculate the maximal audio frequency of a Doppler ultrasound blood flow metre that has a carrier frequency of 7 MHZ, a transducer angle of 45°, a blood velocity of 150 cm/s, and an acoustic velocity of 1500 m/s.

(10 + 5 = 15 marks)

13 (a) Explain Plethysmograph. Derive the general equation that governs the total body Plethysmograph

Or

(b) Explain the working of a bladder stimulator and muscle stimulator.

14. (a) Sketch the Arrangement of a PCO_2 electrode. Explain briefly how it works. What affects its response time?

Or

(b) (i) Explain the working of a line isolation monitor.

(ii) From your knowledge of cardiac electrophysiology explain what rhythm would result from an intense 100 ms shock that has occurred during the P-wave, R-wave and T-wave.

(6 + 9 = 15 marks)

[4 × 15 = 60 marks]

C 84687 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC 14 704 (E)—IMAGE AND VIDEO PROCESSING

Time : Three Hours Maximum : 100 Marks

Part A

Answer **eight** *questions.*
Each question carries 5 *marks.*

1. Explain Image Enhancement.
2. Explain the following special functions :
   (i) Dirac Delta.
   (ii) Kronecker Delta.
   (iii) Signum.
3. Explain Nyquist rate, aliasing and foldover frequencies.
4. Explain contrast stretching, clipping and thresholding.
5. Explain the properties of unitary transforms.
6. What is an Haar transform? Explain.
7. Explain Kalman Filtering.
8. Explain amplitude thresholding. How it is used in image segmentation?
9. What is Composite video and S-video?
10. Briefly explain PAL and SECAM videos.

(8 × 5 = 40 marks)

Part B

11. (a) Explain the properties of Fourier transforms.

Or

(b) (i) Explain Spectral Density function.

(ii) Briefly explain the results of estimation theory and information theory used in Image processing.

(5 + 10 = 15 marks)

Turn over

12. (a) What is histogram equalization? Discuss in detail about the procedure involved in histogram matching.

Or

(b) (i) Discuss RGB and HSI colour models.

(ii) Justify/Contradict the following statement :

Continuous image histogram can be perfectly equalised but it may not be so for digital image.

13. (a) With the functional expressions, explain the following filters :

(i) Geometric mean filter.

(ii) Hormonic mean filter.

(iii) Contrahormonic mean filter.

Or

(b) Discuss constrained and unconstrained Restoration in detail.

14. (a) Discuss in detail about Inter-frame and Intera-frame coding.

Or

(b) Explain H-264 Video Compression Standard.

(4 × 15 = 60 marks)

C 84686 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC 14 704 (C)—EMBEDDED SYSTEMS

Time : Three Hours Maximum : 100 Marks

Part A

Answer **eight** *questions.*
Each question carries 5 *marks.*

1. For a system designer, what considerations are important when selecting a processor?
2. Explain about the presence of Real time clock and timers in embedded system?
3. Explain the two characteristics of asynchronous communication.
4. Differentiate between a function, Interrupt service routine and Task.
5. What happens in dynamic page allocation and dynamic data memory allocation?
6. How to access data in a RAM using indirect addressing mode in a PIC?
7. What the following instructions do in 65 HC 11?

   BCLR $TCTL2_1$ 00100100B

   BSET $TCTL2_1$ 00011000B

   LDAA #00000110 B

   STAA TF LG1

   BSET $TMSK1_1$ 00000010
8. Explain about ARM visible registers and CPSR format.
9. How a DAC is interfaced with a microcontroller?
10. Explain about compiler.

(8 × 5 = 40 marks)

Part B

Answer **all** *question.*
Each question carries 15 *marks.*

11. Discuss the requirements and challenges faced by of Embedded System development.

Or

12. Discuss any two applications of Embedded Systems.

Turn over

13. Describe in detail about Message queues, Task states and Interrupt routines in RTOs.

Or

14. Discuss the design of a Real Time Operating System.

15. With the help of suitable figure, describe the architecture of PIC.

Or

16. Discuss the modes of operation of 8096 and its general purpose I/O port.

17. With suitable circuit show and explain the interfacing of ADC and Relay with microcontroller.

Or

18. Explain how a stepper motor and temperature sensor is interfaced with a microcontroller.

(4 × 15 = 60 marks)

C 84685 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC 14 704 (B)—TELEVISION AND RADAR ENGINEERING

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Why is scanning necessary in TV transmission?
2. Describe the function of saturation and hue controls in NTSC colour TV receiver.
3. Sketch the composite video signal waveform and explain its components.
4. Why is it necessary to modulate the picture and sound signals before transmission?
5. What are the essential functions which are assigned to IF section of the receiver?
6. Explain Doppler Effect.
7. Write a note on RADAR system losses.
8. What is a MTI RADAR?
9. How to model real target behaviour?
10. Draw the structure of a transversal or non-recursive filter for MTI signal processing.

(8 × 5 = 40 marks)

Part B

Answer **all** *question.*
Each question carries 15 *marks.*

11. (a) Describe the principle of operation of a television camera tube.

Or

(b) Describe the principle of colour television transmission.

12. (a) Explain the terms : (i) Primary colours ; (ii) Complementary colours ; (iii) Additive colour mixing ; (iv) Hue ; (v) Saturation ; (vi) Luminance ; and (vii) Chrominance.

Or

(b) With block diagram explain the Digital TV transmitter and receiver

13. (a) (i) Derive the Radar Range equation.

(ii) Explain the primary antenna parameters of Antennas.

Or

(b) (i) Explain the applications of RADAR.

(ii) Explain pulse repetition frequency.

14. (a) Explain in detail about CW RADAR.

Or

(b) Explain :

(i) Blind speed.

(ii) A scope.

(iii) PPI Display.

(4 × 15 = 60 marks)

C 84683 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2020

Electronics and Communication Engineering

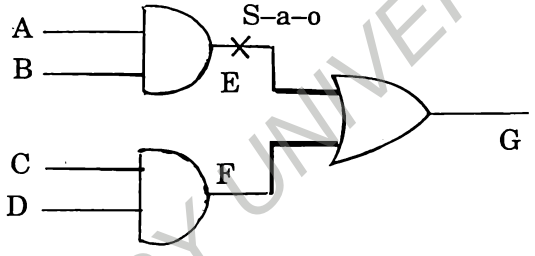
EC 14 703—DIGITAL SYSTEM DESIGN

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

1. What are the delay models supported by VHDL? Give examples for each.
2. Distinguish between Signal assignment and Variable assignments.
3. Write the VHDL code for a 2 × 1 multiplexer using case statements.
4. Explain Clock skew and Clock gating.
5. What is a dynamic hazard? Explain with an example.
6. Explain the difference between Programmable Logic Array and Programmable Array Logic.
7. With generic block diagram, explain 22V10 architecture.
8. Which programming technology is used in XC4000 FPGA family devices? Explain.
9. Derive the test vector to detect the following S–a–o fault :



10. What are bridging faults? How are they tested ?

(8 × 5 = 40 marks)

Part B

11. (a) Write the VHDL code for a full adder using :
    (i) Data Flow Modelling.
    (ii) Behavioural Modelling.
    (iii) Structural Modelling.

(5 + 5 + 5 = 15 marks)

Or

(b) Discuss in detail about packages and configurations in VHDL with suitable examples.

Turn over

12. (a) Design a serial adder using the following sequential network models :

(i) Mealy model.

(ii) Moore model.

(7 + 8 = 15 marks)

Or

(b) (i) Design a sequence detector to detect the sequence 1001.

(ii) Explain static-0 and static-1 hazards and the design of hazard free circuits.

(7 + 8 = 15 marks)

13. (a) Design a 3-bit up down Counter using D-flip-flops. Implement the design using PAL 16R4 architecture provided.

Or

(b) (i) With neat sketch, explain the dedicated carry logic of Xilinx XC 4000 FPGA device.

(ii) Explain the architecture of FLEX10k device.

(5 + 10 = 15 marks)

14. (a) With suitable examples, explain :

(i) Fault equivalence.

(ii) Fault dominance.

(iii) Multiple struck_at faults.

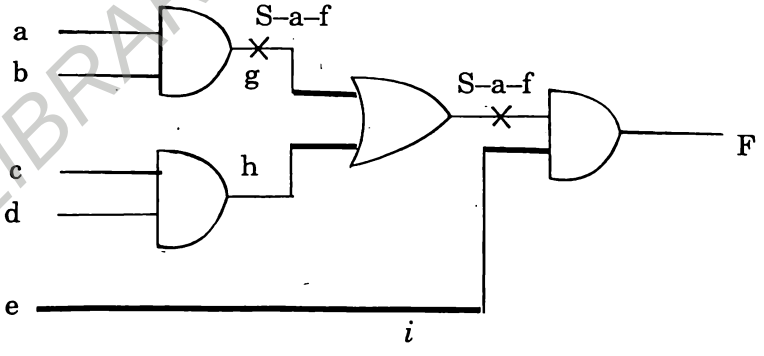
(5 + 5 + 5 = 15 marks)

Or

(b) Derive the test vector to detect the following single struck at fault using

(i) Path sensitization algorithm.

(ii) Boolean difference algorithm.



(7 + 8 = 15 marks)

[4 × 15 = 60 marks]

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC 14 702—MICROWAVE ENGINEERING

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

1. State and explain coupling factor and directivity of a Directional Coupler with an example.
2. Explain the working of an E-Plane Tee.
3. What are the limitations of conventional tubes in microwave generation?
4. Explain the principle of working of a Backward Wave Oscillator.
5. Explain Manley-Rowe relations.
6. Explain the working of a frequency multiplier.
7. Explain Gunn effect.
8. A certain microstrip line has the following parameters :

   $\epsilon_r = 5.23$

   $h = 7$ mils

   $t = 2.8$ mils

   $w = 10$ mils

   Calculate the characteristic impedance Z_0 of the line.
9. What is a K–β diagram? Explain.
10. Explain the electric and magnetic field distribution in a microstrip line.

(8 × 5 = 40 marks)

Part B

11. (a) (i) Explain in detail about scattering matrix and its properties.

    (ii) A two-port network is known to have the following scattering matrix :

$$[S] = \begin{bmatrix} 0.15 \angle 0° & 0.85 \angle -45° \\ 0.85 \angle 45° & 0.2 \angle 0° \end{bmatrix}$$

Determine if the network is reciprocal and lossless. If port two is terminated with a matched load, what is the return loss seen at Port 1? If the Port two is terminated with a short circuit, what is the return loss seen at Port 1?

(5 + 10 = 15 marks)

Or

(b) (i) Explain the working of Isolators and Circulators.

(ii) Explain Magic Tee and deduce its S-matrix.

12. (a) (i) Explain the operation of travelling wave tube.

(ii) Compare TWT and Klystron.

(10 + 5 = 15 marks)

Or

(b) Draw the cross-sectional view of magnetron tube and explain how bunching occurs in it. Derive the expression for Hull cut-off voltage.

13. (a) (i) Explain the structure of IMPATT diode.

(ii) An IMPATT diode has the following parameters :

Carrier drift velocity : $V_d = 2 \times 10^7$ cm/s

Drift region length : L = 6 μm.

Maximum operating voltage : V_o max = 100 V.

Maximum operating current : I_o max = 200 mA.

Efficiency : $\eta = 15\%$

Breakdown voltage : $V_{bd} = 90$ V

Calculate : The maximum CW output power in watts and the resonant frequency.

Or

(b) A single-pole, single-throw switch uses a PIN diode in a shunt configuration. The frequency is 4 GHz, $z_o = 50\ \Omega$ and the diode parameters are $C_j = 0.5$ PF, $R_r = 0.5\ \Omega$, $R_f = 0.3\ \Omega$, $L_i = 0.3$ *n*H. Find the electrical length of an open-circuited shunt stub, placed across the diode, to minimize the insertion loss for the ON state of the switch. Calculate the resulting insertion losses for the ON and OFF states.

14. (a) Find the width for a 50 Ω copper strip line conductor, with $b = 0.32$ cm and $E_r = 2.20$. If the dielectric loss tangent is 0.001 and the operating frequency is 10 GHz. Calculate the attenuation in db/λ. Assume a conductor thickness of $t = 0.01$ mm.

Or

(b) Design a low-pass composite filter with a cut-off frequency of 2 MHz and impedance of 75 Ω.

(4 × 15 = 60 marks)

C 84681 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC 14 701—INFORMATION THEORY AND CODING

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

1. Encode the following source using Shannon-Fano procedure. Find the efficiency of the code :

   $X = \{x_1, x_2, x_3, x_4, x_5\}$.

   $P(X) = \{0.2, 0.1, 0.1, 0.45\}$.

2. Encode the following source using Huffmann procedure. Find the efficiency of the code :

   $X = \{x_1, x_2, x_3, x_4, x_5\}$.

   $P(X) = \{0.15, 0.05, 0.2, 0.25, 0.35\}$.

3. Define a binary symmetric channel. Find any two entropies of the bsc system. Make appropriate assumptions.

4. Discuss briefly on binary field arithmetic.

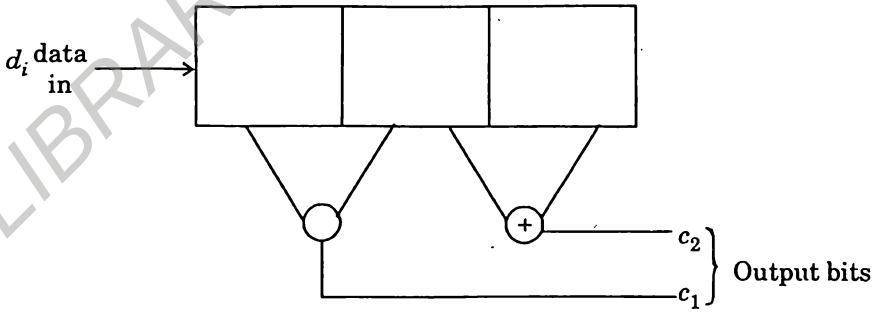
5. State and prove any three properties of linear block code.

6. Write notes on BCH codes.

7. State and prove the conditions for a polynomial to be a generator polynomial of a (n, k) cyclic code.

8. Compare the performance of linear block codes, cyclic codes and convolutional codes.

9. For the following convolutional codes, draw the state diagram and trellis diagram :



10. What are systematic and non-systematic codes ? Give an example for each. Also find the hamming weights of the code words.

(8 × 5 = 40 marks)

Turn over

Part B

11. (a) State and prove source-coding theorem.

Or

(b) State and prove the properties of mutual information.

12. (a) Explain the construction and properties of Galois field GF (2 M).

Or

(b) Explain a method each to find and decode a (n, k) linear block code. Make suitable assumptions.

13. (a) (i) Find the systematic and non-systematic (≥ 4) cyclic words. Assume a generator polynomial $1 + x + x^3$.

(ii) Compare the performance of BCH and Reed Solomon codes.

Or

(b) Explain a method to detect and correct errors in a (n, k) cyclic code word.

14. (a) Explain Viterbi algorithm to decode a convolutional code word. Make appropriate assumptions.

Or

(b) Explain interleaved convolutional coding procedure. Compare its performance with that of a convolutional codes.

$(4 \times 15 = 60$ marks)

C 84679 (Pages : 2) Name.....

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SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 14 705 D—PROFESSIONAL ETHICS

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

I. 1 Describe in details about the senses of Engineering Ethics.

2 Explain the concept of liability.

3 Generalize what is meant by ethical egoism.

4 Explain the types of occupational crime.

5 Discuss the Management of conflicts in detail.

6 Summarize the IEEE Code of Ethics.

7 Enumerate the code of ethics of engineers.

8 Explain how to Evaluate the self-confidence.

9 Summarize the importance of sharing.

10 Identify in detail the importance of civic virtue.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

II. 1 i) Summarize in details about Gilligan's Theory.

ii) Analyze in detail the Customs.

Or

2 i) Demonstrate the various problems of law in Engineering.

ii) Describe and Compare engineering experiments with standard experiments.

Turn over

3 i) Explain Chernobyl Case.

ii) Explain the concept of liability with suitable example.

Or

4 i) Compare and Contrast the between employee rights and professional rights.

ii) Explain in detail the types of conflicts of interests.

5 i) Describe the significance of the concept of Computer Ethics.

ii) Explain the various Global Issues.

Or

6 i) Explain how engineers should act as consultants and its importance.

ii) Discuss in details about Moral Leadership.

7 i) Explain some important human values.

ii) Discuss about how respect for others play important role in ethics.

Or

8 i) Examine the importance of empathy.

ii) Explain character and its importance.

(4 × 15 = 60 marks)

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SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 14 705 C—ELECTRIC POWER UTILISATION

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

Each question carries 5 *marks.*

1. Explain the features of an ideal traction systems
2. Write short notes on sub-traction for single-phase A.C. systems.
3. A train is to be run between two stations 5 kms. apart at an average speed of 50 km/hr. If the maximum speed is to be limited to 70 km/hr, acceleration to 2 km./hr./sec, braking retardation to 4km./hr./sec. and coasting retardation to 0.1 km./hr./sec, determine the speed at the end of coasting, duration of coasting period and braking period.
4. Define : (i) Mean hemispherical Candlepower ; and (ii) Mean spherical Candlepower.
5. What are the causes of failure in heating elements ?
6. What are the types of ARC furnace ? Describe the operation of them.
7. Classify the various types of resistance heating.
8. Explain the operation of fluorescent lamp in details.
9. What are desirable, characteristics of ideal refrigerant ? Explain how refrigerants are designated.
10. Write note on shell and tube condenser.

(8 × 5 = 40 marks)

Part B

Answer **all** *question.*
Each question carries 15 *marks.*

11. (a) (i) Explain the recent trends in electric traction. (7 marks)

(ii) Draw the speed - Time curve of a traction system. Also explain various periods and the action.

(8 marks)

Or

(b) (i) Explain how rheostatic braking is done in D.C. shunt motors and series motors.

(7 marks)

(ii) Explain and compare the various arrangements of current collection in traction.

(8 marks)

12. (a) (i) Draw a neat sketch of induction furnace and generalize its working. (7 marks)

(ii) Write the concept of high frequency eddy current heating. (8 marks)

Or

(b) (i) Discuss in details about any *two* types of resistance welding. (10 marks)

(ii) Discuss an application of Electroplating. (5 marks)

13. (a) (i) State and explain laws of Illumination. (7 marks)

(ii) A lamp of 500 candle power is placed at the centre of a room, 20 m. × 10 m. × 5 m. Calculate the illumination in each corner of the floor and a point in the middle of a 10 m. wall at a height of 2 m. from floor.

(8 marks)

Or

(b) Point out the various factors to be taken into account for designing street lighting and flood lighting.

(15 marks)

14. (a) (i) Explain the working of Vapour compression refrigeration system with the help of a neat sketch.

(8 marks)

(ii) Explain the procedure for calculating cooling load due to infiltration air. (7 marks)

Or

(b) State different types of compressors used in refrigerators. Explain any *two* compressors with their salient features.

(15 marks)

[4 × 15 = 60 marks]

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SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 14 705 B—HIGH VOLTAGE ENGINEERING

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

1. Explain the Breakdown mechanism in solid dielectrics.
2. Discuss the phenomena of electrical conduction in liquids.
3. Describe the necessity of generating High DC voltage.
4. How is the wave front and wave tail times controlled in impulse generator circuits ?
5. Write the different forms of high voltages required for the testing of electrical apparatus
6. How stray effect is reduced in shunt type of measurement ?
7. Explain the Hall generator for measuring high dc current
8. How partial discharges are measured using straight detectors ?
9. State and explain the phenomenon of over voltage.
10. Explain what are partial discharges.

(8 × 5 = 40 marks)

Part B

Answer any **four** *questions.*

11. (a) (i) Explain the phenomenon of corona discharge and breakdown mechanism in non-uniform fields.

(7 marks)

(ii) Explain the following Breakdown mechanism in solid dielectrics.

(8 marks)

Or

(b) Outline concept of anode and the cathode streamers. Explain the mechanism of their formation and development leading to breakdown.

(15 marks)

Turn over

12. (a) (i) Explain simple voltage doubler and cascaded voltage doubler used for generation of high DC voltages.

(15 marks)

Or

(b) (i) Discuss elaborately the principle and operation of Cascaded transformers for generating high AC voltages.

(8 marks)

(ii) How are rectangular current pulses generated for testing purposes ? How is their time duration controlled ?

(7 marks)

13. (a) (i) Explain Electrostatic voltmeter used for measurement of high voltage.

(8 marks)

(ii) Explain the peak reading AC voltmeter. (7 marks)

Or

(b) (i) With a neat circuit and phasor diagram, explain the capacitance voltage transformer.

(10 marks)

(ii) Write short note on hall effect generator. (5 marks)

14. (a) (i) The lossless standard capacitor used in high voltage Schering Bridge has a value 100 pF. In a certain measurement, the other arms of the bridge at balance are (i) a resistance of 641 ohms and (ii) a capacitance of 0.052 μ F in parallel with a resistance of 2500 ohms. Determine capacitance and loss tangent of the specimen at 50 Hz.

(8 marks)

(ii) Explain with neat diagram the operation of pulse current measurement of partial discharges by straight detection technique.

(7 marks)

Or

(b) (i) Describe in detail about testing of circuit breakers. (15 marks)

[4 × 15 = 60 marks]

C 84675 (Pages : 2) Name.....

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SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 14 704D—MECHATRONICS

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Draft short notes on incremental and absolute systems with suitable example.
2. Clarify the design consideration of NC tools.
3. Explain about the stepper motor.
4. Write Short notes on pulse digitalizer and tachometer.
5. Compare CNC machines with conventional machine.
6. Write any *ten* proprietary and miscellaneous codes for CNC program.
7. Explain the computer aided programming with suitable example.
8. Explain the following with relevant application.
   (i) Tactile sensor ; and
   (ii) Torque sensor.
9. Differentiate lead through programming and textual programming in industrial robotics.
10. Define intelligent robots.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. Brief notes on open and closed loop system with suitable example.

Or

12. Differentiate the NC and CNC program with suitable example.

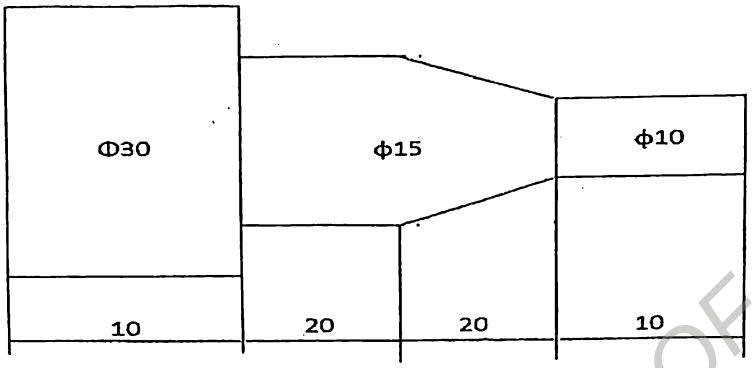
Turn over

13. Briefly describe the type of DC Motor Drive used in CNC Machine tools.

Or

14. Write brief notes on flow of data in NC Machines.

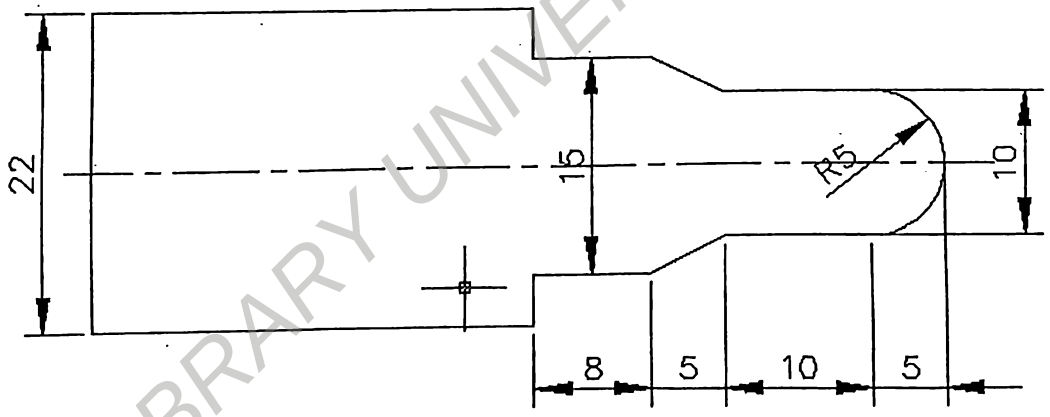
15. Write complete CNC part program for the component shown in below figure.



ALL DIMENSIONS ARE IN MM

Or

16. Write a CNC part program for the below figure. Assume spindle speed and feed. Use standard ISO G and M codes.



17. Deliberate the classification of robots based on configuration.

Or

18. Explain any *five* type of sensing device used in industrial robotics with neat sketch.

(4 × 15 = 60 marks)

C 84673 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 14 704 B—ELECTRICAL MACHINE DESIGN

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions out of ten.*
Each question carries 5 *marks.*

1. Describe the effects of higher the value of specific electric loading in the design of DC machines.
2. Explain the separation of D and L in the design of DC machines.
3. Compare Power and distribution transformers.
4. Express the net iron area and area of copper for : i) Square core and ii) cruciform core.
5. Explain the design principle of current transformer.
6. Describe the types of synchronous machines.
7. What are the factors influencing the performance of synchronous machine with respect to choice of specific magnetic loading ?
8. Compare squirrel cage and slip ring Induction Motors.
9. Explain the advantages and disadvantages of selecting larger airgap in the design of Induction machine.
10. Developan approximate equivalent circuit of an Induction motor.

(8 × 5 = 40 marks)

Part B

Answer **all** *the questions.*
Each question carries 15 *marks.*

11. a) Discuss in detail about the factors affecting the choice of number of poles in the design of DC machines.

Or

b) Determine the diameter and length of the armature core for a 55kW, 110V, 1000 r.p.m., and 4pole dc shunt generator. Assume : Specific magnetic loading 0.5T, Specific electric loading 13000 ampere - turns, Pole arc 70% of pole pitch and length of core about 1.1 times the pole arc, Allow 10A for field current and a voltage drop of 4V for the armature circuit. Determine also the number of armature conductors and slots.

Turn over

12 a) Derive the output equation of single phase transformer and discuss the significance of window space factor.

Or

b) Determine the main dimensions of the 3 limb core (i.e., 3 phase, 3 leg core type transformer), the number of turns and cross-sectional area of the conductors of a 350 kVA, 11000/ 3300 V, star / delta, 3 phase, 50 Hz transformer. Assume: Volt / turn = 11, maximum flux density = 1.25 T. Net cross-section of core = 0.6 d2, window space factor = 0.27, window proportion = 3:1, current density = 250 A/cm^2.

13. a) A water wheel generator with power output of 4750 kVA, 13.8 kV, 50 Hz, 1000 rpm, working at a pf of 0.8 has a stator bore and gross core length of 112 cm and 98 cm respectively. Determine the loading constants for this machine. Using the design constants obtained from the above machine determine the main dimensions of the water wheel generator with 6250 kVA, 13.8 kV, 50 Hz, 750 rpm operating at a power factor of 0.85.

Or

b) Discuss the Design of the field System of Salient pole Alternator.

14. a) Obtain the following design information for the stator of a 30 kW, 440 V, 3 Φ , 6 pole, 50 Hz delta connected, squirrel cage induction motor, (i) Main dimension of the stator, (ii) No. of turns/phase, (iii) No. of stator slots, (iv) No. of conductors per slot. Assume suitable values for the missing design data.

Or

b) Estimate the main dimensions, air-gap length, stator slots, stator turns/phase and cross-sectional area of the stator and rotor conductors for a 3-phase, 15 HP, 400V, 6-pole, 50 Hz, 975 rpm, induction motor. The motor is suitable for star delta starting. Bav = 0.45 Wb/m2, $L\tau$ = 0.85, p.f.= 0.85, efficiency = 0.9, ac = 20,000 amp.cond./metre.

(4 × 15 = 60 marks)

C 84672 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 14 704 A–SWITCHED MODE POWER CONVERTERS

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

1. Obtain the input-output voltage and current relation as a function of duty ratio for a Buck-Boost dc-dc converter in continuous conduction mode.
2. Describe the working principle and modes of operation of full bridge converter.
3. Obtain the boundary conditions between continuous and discontinuous conduction mode of operation for boost converter.
4. Compare and contrast switched mode power supply and linear power supply.
5. With the help of circuit and relevant waveforms, discuss the working of push-pull converter.
6. Write short notes on power conditioners.
7. Discuss in brief about the harmonic elimination methods in the inverters ?
8. Explain hysteresis current control method of voltage control of Inverter ?
9. Provide a comparison of ZVS and ZCS topologies.
10. What is meant by resonant converters ? How are they useful in SMPC applications ?

(8 × 5 = 40 marks)

Part B

Answer any **four** *questions.*

11. (a) (i) Design a Buck converter to produce an output voltage of 18 V across 10 Ω load resistance. The output voltage ripple must not exceed 0.5 percent. The DC supply is 48V. Design for continuous inductor current. Find out the duty ratio, the values of inductance and capacitor.

(7 marks)

(ii) Briefly explain the operating modes of Buck converter and deduce expression for boundary value of inductance to decide operating modes.

(8 marks)

Or

Turn over

(b) (i) Explain the operation of SEPIC converter with neat diagram and wave forms and derive the output voltage.

(10 marks)

(ii) Compare and contrast between DC to DC converters. (5 marks)

12. (a) (i) Explain the principle of operation of a push pull converter with relevant Wave forms. Derive an expression for the duty ratio. What are the merits and demerits of a push pull configuration ?

(10 marks)

(ii) Write short notes on current source dc-dc converters. (5 marks)

Or

(b) (i) With circuit diagram and wave forms, explain the principle of operation of a flyback converter. Derive expressions for duty ratio, peak current through the switch and peak voltage across the switch.

(8 marks)

(ii) Explain the operation of the forward converter with demagnetizing winding and illustrate with, inductor current, switch current, switch voltage waveforms and magnetizing current

(7 marks)

13. (a) Discuss the principle of working of a three phase voltage source inverter. Draw a phase and line voltage waveform on the assumptions that each device conducts for 180 degree. Derive expression for RMS value of line voltage phase voltage and fundamental phase voltage.

(15 marks)

Or

(b) Explain in detail the space vector modulation for voltage control of three phase inverter. Draw the construction of inverter space vector, space vector of 3 phase bridge inverter showing reference voltage trajectory voltage vectors and corresponding reference phase voltage wave. Tabulate the summary of inverter switching state and also plot the construction of symmetrical pulse pattern for three phases.

(15 marks)

14. (a) (i) Explain the operation of a series loaded half bridge resonant converter operating in discontinuous conduction mode with relevant circuits, expressions and wave forms.

(10 marks)

(ii) Classify the resonant converters. (5 marks)

Or

(b) (i) Discuss the operation of ZVS resonant switch converters. Draw the circuit diagram and relevant waveforms.

(10 marks)

(ii) Compare L type and M type resonant converters. (5 marks)

[4 × 15 = 60 marks)

C 84671 (Pages : 2) Name.....

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SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 14 703—ELECTRIC DRIVES

Time : Three Hours Maximum : 100 Marks

Part A

Answer **eight** *questions.*
Each question carries 5 *marks.*

1. Draw the characteristics of different types of loads and explain?
2. Discuss various types of converters employed in drives.
3. Explain about load equalisation.
4. Explain the armature control method of speed control of DC motor ?
5. Differentiate between continuous and discontinuous conduction mode of single phase fully controlled converter fed DC motor.
6. What is a chopper ? Explain the operation of class A chopper with waveforms
7. Draw the equivalent circuit of an induction motor and explain the terms.
8. Write short notes on vector control of Induction motor drive.
9. How reluctance motor is differed from synchronous motor ?
10. Explain the Unipolar drive circuit used for stepper motor control.

(8 × 5 = 40 marks)

Part B

Answer **all** *question.*
Each question carries 15 *marks.*

11. (a) (i) Discuss how the following speed transitions are carried out : (i) Increase and decrease in speed in same direction ; and (ii) Speed reversal.

(15 marks)

Or

(b) (i) Explain in detail about steady state stability in electrical drive system. (8 marks)

(ii) Discuss the different modes of operation of an electrical drive. (7 marks)

12. (a) Explain the Electrical and mechanical characteristics of commonly used electric motors. (15 marks)

Or

(b) (i) Explain the operation of four quadrant DC chopper drive. (7 marks)

(ii) Solve a 220 V, 20 A,1000 r.p.m. separately excited dc motor has an armature resistance of 2.5 Ω.The motor is controlled by a step down chopper with a frequency of 1 kHz. The input DC voltage to the chopper is 250 V.Identify what will be the duty cycle of the chopper for the motor to operate at a speed of 600 r.p.m. delivering rated torque. (8 marks)

13. (a) (i) Describe the four modes of operation of a static krammer drive with neat diagram. (15 marks)

Or

(b) (i) Show and explain the block diagram of vector control of induction motor drive. (8 marks)

(ii) Justify why the power factor of slip power recovery scheme of speed control of induction motor is low. (7 marks)

14. (a) (i) Explain the constant marginal angle control technique of self controlled synchronous motor drive employing load commutate thyristor inverter. (15 marks)

Or

(b) (i) Describe using a diagram the working of a sinusoidally excited permanent magnet synchronous motor. (15 marks)

[4 × 15 = 60 marks]

C 84670 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) [2014 SCHEME] DEGREE EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 14 702—MODERN CONTROL THEORY

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Define the following :—

   (i) Eigen values ; (ii) Eigen vectors ; (iii) State of a system.

2. Derive the solution of Non-homogeneous state equations.

3. Construct phase trajectory for the system described by the equation :

$$\frac{dx_2}{dx_1} = \frac{4x_1 + 3x_2}{x_1 + x_2}.$$

   Comment on the stability of the system.

4. Explain the following nonlinearties :

   (i) Saturation ; and (ii) Dead-zone.

5. Discuss the describing function analysis of non-linear systems.

6. Briefly explain the concept of equilibrium points and the stability definitions.

7. Investigate the stability of the non-linear system using direct method of Liapunov :

$$\dot{x}_1 = x_2$$
$$\dot{x}_2 = -x_1 - x_1^2 x_2.$$

8. Explain the Linear system with full order state observer with neat block diagram.

9. Explain with an example the concept of controllability in continuous time invariant systems.

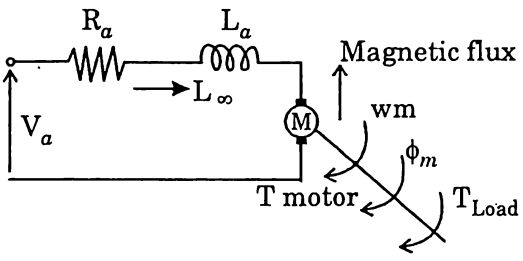
10. State and explain the principle of optimality.

(8 × 5 = 40 marks)

Part B

Answer **all** *question.*
Each question carries 15 *marks.*

1. (a) Consider the system shown for the d.c. motor.



Obtain the state space model. Obtain its state diagram and also the block diagram.

(15 marks)

Or

(b) (i) Explain the properties of state transition matrix. (5 marks)

(ii) Find $x_1(t)$ and $x_2(t)$ of the system described by :

$$\begin{bmatrix}\dot{x}_1(t)\\ \dot{x}_2(t)\end{bmatrix}=\begin{bmatrix}0 & 1\\ -3 & -2\end{bmatrix}\begin{bmatrix}x_1(t)\\ x_2(t)\end{bmatrix}$$

Where the initial condition are

$$\begin{bmatrix}x_1(0)\\ x_2(0)\end{bmatrix}=\begin{bmatrix}1\\ -1\end{bmatrix}.$$

(10 marks)

2. (a) (i) What are singular points and how are they classified ? Sketch them and explain.

(7 marks)

(ii) Explain how phase plane trajectory using method of isoclines can be constructed for the system described by

$$\frac{d^2x}{dt^2}+\frac{dx}{dt}+x(t)=0.$$

(8 marks)

Or

(b) What is a describing function ? Explain how an element with dead zone can be analyzed using describing function method.

(15 marks)

3. (a) (i) Construct phase trajectory for the system described by the equation :

$$\frac{dx_2}{dx_1} = \frac{4x_1 + 3x_2}{x_1 + x_2}.$$

Comment on the stability of the system.

(9 marks)

(ii) Explain the singular points in non-linear systems. (6 marks)

Or

(b) (i) Explain method of constructing Lyapunov functions by Krasooviski's method for non-linear systems.

(8 marks)

(ii) State and prove the Liapunov's stability theorem for linear time invariant systems.

(8 marks)

4. (a) Show that the dynamic system described by the following equation with usual notations is completely output controllable if and only if the composite $[m \times nr]$ matrix p_1, where

$[P] = [CB : CAB : CA^2B : \ldots : CA^{n-1}B]$ is of rank m.

$$\underline{\dot{x}} = [A]\underline{x} + [B]\underline{u}$$
$$\underline{y} = [C]\underline{x}$$

(15 marks)

Or

(b) Consider the system described by the state model :

$$\dot{x} = Ax$$
$$y = Cx$$

Where $A = \begin{bmatrix} -1 & 1 \\ 1 & -2 \end{bmatrix}$ & $C = [1 \quad 0]$.

Design a full order state observer. The desired Eigen values for the observer matrix are $\mu_1 = -5$ and $\mu_2 = -5$.

(15 marks)

[4 × 15 = 60 marks]

C 84669 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 14 701—POWER SYSTEM ANALYSIS

Time : Three Hours Maximum : 100 Marks

Part A

1. State and discuss the advantages of the p.u form of representation?
2. Explain the steady state and transient state with the help of a RL circuit.
3. Write and elaborate quantities specified and the quantities to be determined from load flow study for various types of buses.
4. Discuss the effect of acceleration factor in the load flow solution algorithm.
5. List out the differences in representing the power system for load flow and short circuit studies.
6. What are the assumptions made in short circuit studies of a large power system network ?
7. Compare and Contrast between sub transient reactance and transient reactance in short circuit studies.
8. Explain the need for short circuit studies.
9. List the assumptions made in multi-machine stability studies.
10. Explain the terms critical clearing angle and critical clearing time in connection with transient stability of a power system.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*

11. a) Draw the impedance diagram for the electric power system shown in given figure showing all impedance in per unit on a 100 MVA base. Choose 20 KV as the voltage base for generator. The tree-phase power and line-lie ratings are given below :

Generator G1	:	90 MVA 20 KV X = 9 %
Transformer T1	:	80 MVA 20 /200 KV X = 16 %
Transformer T2	:	80 MVA 200 / 20 KV X = 20 %
Generator G2	:	90 MVA 18 KV X = 9 %
Line	:	200KV X = 120
Load	:	200 KV, S = 48 MW + j64 MVAR.

(15 marks)

Or

Turn over

b) Explain clearly with detailed flowchart, the computational procedure for load flow solution using N-R method when the system contains all types of buses.

(15 marks)

12. a) The fuel cost in \$/h for a three thermal plants are given by :

$F_1 = 350 + 7.2P_{G1} + 0.004P^2G1$ Rs/h

$F_2 = 500 + 7.3P_{G1} + 0.0025P^2G1$ Rs/h

$F_3 = 600 + 6.7\ P_{G1} + 0.003P^2G1$ Rs/h

P_{G1}, P_{G2}, P_{G3} are in MW. Find the optimal schedule and compare the cost of this to the case when the generators share the load equally if : (i) PD=450 MW ; and (ii) PD = 800 MW.

(15 marks)

Or

b) i) Explain load frequency control problem in a Multi-area power system. (7 marks)

ii) Derive an expression for steady-state change of frequency and tie-line power transfer of a two-area power system.

(8 marks)

13. a) With the help of a detailed flow chart, explain how a symmetrical fault can be analysed using Z Bus.

(15 marks)

Or

b) Explain the short circuit model of a synchronous machine under short circuit conditions. What symmetrical components ? Explain the symmetrical component transformation.

(15 marks)

14. a) Derive the swing equation of a synchronous machine swinging against an infinite bus. Clearly state the assumptions in deducing the swing equation.

(15 marks)

Or

b) Explain the modified Euler method of analyzing multi machine power system for stability with a neat flow chart.

(15 marks)

[4 × 15 = 60 marks]

C 84667 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2020

Mechanical Engineering

ME 14 705F—COMPOSITE MATERIALS

Time : Three Hours Maximum : 100 Marks

Part A

1. What fiber factors contribute to the mechanical performance of a composite ?
2. Other than the fiber and the matrix, what other factors influence the mechanical performance of a composite ?
3. Illustrate the classification of composite materials. State the merits and demerits of each type.
4. Explain in detail about the longitudinal behaviour of unidirectional composites.
5. Discuss about the failure modes of a unidirectional composite subjected to longitudinal tensile load.
6. What is losipescu shear test ?
7. Explain about resultant forces and moments acting on composite laminate.
8. Discuss about disadvantages of composite materials.
9. Classification the MMC and CMC based on matrix material.
10. What are the different types of glass fibres ? What are their key features ?

(8 × 5 = 40 marks)

Part B

11. (a) Explain in detail about rule of mixture.

Or

(b) Explain in detail about the filament winding process and winding pattern with a neat sketch. Also state its advantages and limitations.

Turn over

12. (a) Explain in detail about ultrasonic testing and different techniques used to measure damages in composite materials using ultrasonic testing.

Or

(b) Discuss the methods to determine inter laminar fracture toughness.

13. (a) Discuss in detail about the models used to study the transverse strength and stiffness properties of composites.

Or

(b) Explain in detail about the analysis of laminated composites.

14. (a) Explain in detail about carbon-carbon composites(C/Cs). Also elaborate the applications and advantages of C/Cs.

Or

(b) Write short note on symmetric and cross-ply laminates.

(4 × 15 = 60 marks)

C 84666 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Mechanical Engineering

ME 14 705 D—DESIGN OF JIGS AND FIXTURES

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Define location. List out any three locating principles.
2. Show the functional use of diamond pins by neat sketches.
3. Sketch and describe the proper V block orientation to locate the round work piece.
4. Discuss the application of magnetic clamping.
5. Sketch and describe the typical screw clamp and cam clamp.
6. Differentiate between jig and fixture. Write salient features of universal jig.
7. Discuss any two types of drill bushes with aid of neat sketch.
8. Describe the use of angle plate jig by using suitable sketch.
9. With aid of neat sketch, discuss the function of nut mandrel work holding device.
10. Discuss about straddle milling and line milling with aid simple sketch.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. (a) (i) Discuss in detail about rules applied in location of work pieces. (7 marks)

(ii) Explain the conical locating method used for locating from circular surfaces. (8 marks)

Or

(b) Enumerate the application of spherical, nest and adjustable rest pin locators by neat sketches.

12. (a) Explain the working of air to hydraulic booster power operated clamps. Also, list out the advantages of power operated clamps

Or

(b) With aid of simple sketch, discuss the use of wedge clamp, toggle clamp and two way clamp.

Turn over

13. (a) Explain the construction of leaf drill jig and post drill jig by neat sketches.

Or

(b) Design a drill jig for the use when drilling the 12mm diameter hole in the shank of the adopter shown in Fig. 1.

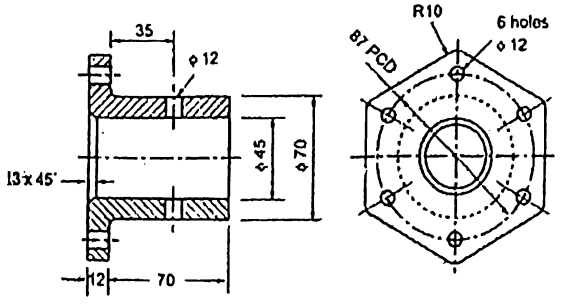


Fig.1

14. (a) Draw the milling fixture for milling slot of 6 mm wide and 6 mm deep on the component shown in Fig.2.

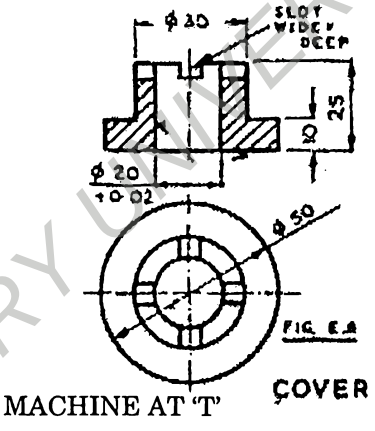


Fig.2

Or

(b) Discuss the function of face plate, threaded mandrels and collets in turning fixture with suitable sketch.

(4 × 15 = 60 marks)

C 84663 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Mechanical Engineering

ME 14 705 A—LOGISTICS AND SUPPLY CHAIN MANAGEMENT

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

Each question carries 5 *marks.*

1. Discuss about the three basicsteps to achieve strategic fit.
2. Explain about the importance of value chain with respect to new product development.
3. Suggest different ways for a company to overcome uncertainty.
4. Describe the reasons for holding inventory in an industry.
5. Elaborate about various inventory cost that influences on deciding the inventory size.
6. Write short note on impact of internet in pricing strategy.
7. Discuss about risk management strategies in transportation.
8. Write about the significant role played by safety inventory in inventory management.
9. Discuss about the significance of supply chain decision making framework.
10. Illustrate the functions of logistics system.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*

Each question carries 15 *marks.*

11. (a) Explain in detail about four process cycles of supply chain.

Or

(b) Explain in detail about the decision phases in a supply chain.

12. (a) Elucidate in detail about the role of safety inventory in a supply chain.

Or

(b) The TransCanada Lumber Company and Mill processes 10,000 logs annually, operating 250 days per year. Immediately upon receiving an order, the logging company's supplier begins delivery to the lumber mill at the rate of 60 logs per day. The lumber mill has determined that the ordering cost is Rs1600 per order, and the cost of carrying logs in inventory before they are processed is Rs15 per log on an annual basis. Determine the following :

i) The optimal order size.

ii) The total inventory cost associated with the optimal order quantity.

iii) The number of operating days between orders.

iv) The number of operating days required to receive an order.

13. (a) Explain in detail about the role of pricing and revenue management in the Supply Chain.

Or

(b) Explain in detail about supplier sourcing and assessment factor.

14. (a) Describe about various factors affecting transportation decisions and various transportation modes.

Or

(b) Explain in detail about factors influencing distribution network design.

(4 × 15 = 60 marks)

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2020

Mechanical Engineering

ME 14 704 (G)—FINITE ELEMENT METHODS

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Write down the stiffness Matrix for an uncompressible laminar fluid flow takes place through a pipe of diameter D and length L.
2. State the properties of stiffness matrix.
3. Distinguish between Essential boundary conditions and Natural boundary conditions.
4. Define natural and global co-ordinate system.
5. Why polynomials are generally used as shape functions?
6. Define a CST element. Mention any one advantage and its disadvantage.
7. What do you mean by weak and strong form is variational methods.
8. Write short note on Axisymmetric problems.
9. Write down the Jacobian Matrix for four noded quadrilateral element.
10. What are Isoparametric elements ? What is its use?

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. (a) Explain the process of discretization of a structure in FEM in detail with suitable illustration.

Or

(b) Briefly explain the historical development of FEM numerical tool. Explain the advantages and limitations of FEM.

(15 marks)

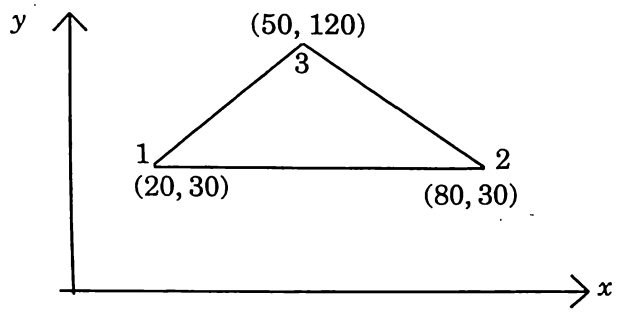
Turn over

12. (a) Derive the shape function and element stiffness Matrix for a plane truss element.

Or

(b) Determine the stiffness Matrix for the CST element as shown. The co-ordinates are given in mm. Assume plane stress conditions.

Take E = 210 GPa, $\upsilon = 0.25$, and $t = 10$ mm.



(15 marks)

13. (a) Derive the Finite element formulation using Rayleigh-Ritz method.

Or

(b) Explain in detail about various modelling aspect, element size and shape, also the sources of error.

14. (a) Evaluate the integral $I = \int_{-1}^{1} (a_1 + a_2 x + a_3 x^2 + a_4 x^3)\, dx$ using Gauss integration.

Or

(b) Write short notes on :

(i) Accuracy and Mesh distortion.

(ii) Galerkin FE formulation.

(7 + 8 = 15 marks)

[4 × 15 = 60 marks]

C 84659 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Mechanical Engineering

ME 14 704 C—RENEWABLE ENERGY TECHNOLOGY

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions out of ten.*
Each question carries 5 *marks.*

1. Explain the basic sun-earth angles.
2. Explain the solar spectrum with its classification based on wavelength.
3. Discuss the basic methods for storing thermal energy.
4. Write short notes on solar dehumidification.
5. Explain briefly about passive and active solar cooling systems.
6. Compare aerobic and anaerobic bio conversion.
7. Why bio energy is considered as a form of solar energy ? List some of the sources of biomass.
8. What are bio-fuels ? Explain the classification of bio-fuels.
9. What do you mean by coefficient of performance and tip speed ratio of a wind turbine ?
10. What are the advantages and limitations of tidal power generation ?

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. What is a solar thermal collector ? Explain the construction and working of a liquid flat plate collector with the help of neat diagrams.

Or

12. Explain how solar radiation can be measured using a pyranometer and a pyrheliometer.

Turn over

13. List the properties of Phase Change Materials (PCM's). Explain the working of PCM's as thermal energy storage system.

Or

14. Write notes on the following :

    i) Aquifer thermal energy storage system. (7.5 marks)

    ii) Solar ponds. (7.5 marks)

15. Explain the classification of biogas plants based on the digestion process. Compare their features.

Or

16. Explain with the help of schematic diagrams the classification of gasifiers based on the type of bed.

17. How are wind turbines classified ? Explain the construction and working of a horizontal axis wind turbine with the help of neat sketches.

Or

18. Explain the working principle of Ocean Thermal Energy Conversion (OTEC). Describe the working of main types of OTEC power plants.

(4 × 15 = 60 marks)

C 84658 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2020

Mechanical Engineering

ME 14 704 B—INDUSTRIAL SAFETY ENGINEERING

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. What are the unsafe acts of an individual that causes accident ?
2. What is meant by unsafe condition ? Give examples.
3. Write the benefits of FMECA.
4. What is meant by fire hydrant ? What are its types ?
5. Discuss briefly about the effects of noise on human beings.
6. Write the classification of air pollutants.
7. Briefly explain how fabric filter reduces air pollution.
8. What is emergency preparedness ?
9. Explain briefly about Weibull distribution.
10. Write a note on reliability of systems with components in parallel.

(8 × 5 = 40 marks)

Part B

11. (a) Explain in detail about safety performance measurement.

Or

(b) Discuss in detail about steps in FMECA.

12. (a) Explain in detail about types of fire and suitable fire extinguishers for them.

Or

(b) Describe about sources of electrical hazards.

Turn over

13. (a) Explain in detail about sources and harmful effects of air pollution.

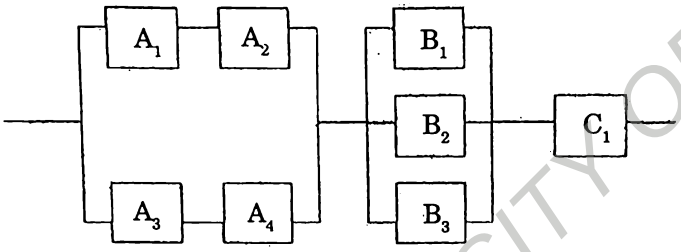
Or

(b) Discuss the construction and working of gravitational settling chamber with neat sketch.

14. (a) Find the reliability of the eight component system shown in figure. Some components are in series and some are in parallel. The reliabilities for the components are as follows :

$R_{A1} = 0.92$, $R_{A2} = 00.90$, $R_{A3} = 0.88$, $R_{A4} = 0.96$,

$R_{B1} = 0.95$, $R_{B2} = 0.90$, $R_{B3} = 0.92$, $R_{C1} = 0.93$.



Or

(b) Explain in detail about Exponential distribution.

(4 × 15 = 60 marks)

C 84657 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Mechanical Engineering

ME 14 704 A—FINANCIAL MANAGEMENT

Time : Three Hours Maximum : 100 Marks

Part A

I. Answer *all* the questions :

1 Profit Maximisation and Wealth Maximisation. Enumerate.

2 Write notes on investment financing.

3 "To avoid the problem of shortage and surplus of funds, what is required in Financial management ? Name the concept and explain four points of importance.

4 What is payback period ? How is it calculated ?

5 Explain the process of average rate of return method.

6 What are the social responsibilities of a firm ?

7 Explain briefly five factors determining the amount of fixed capital.

8 Explain the term liquidity profitability tangle.

9 What are the different sources of raising finance for a large organisation ?

10 What is lease financing ?

(8 × 5 = 40 marks)

Part B

II. Answer *all* questions :

11 Explain the objectives and functions of financial management.

Or

12 Discuss in detail the internal and external factors influencing financial decisions.

13 A company has to choose one of the following two mutually exclusive projects A and B. Project A requires Rs. 20,000 and Project B requires Rs. 15,000 as initial investment. The firms cost of capital is 10 %. Suggest which project should be accepted under NPV method. Following are the net cash flows as shown in Table. 1 :

Table . 1

Year	1	2	3	4	5
Project A	4200	4800	7000	8000	4000
Project B	4200	4500	4000	5000	4000

Year 1	Year 2	Year 3	Year 4	Year 5
0.909	0.826	0.751	0.683	0.621

Calculate : net present value.

Present value Rs.1 @ 10 % (discount factor) using present value tables.

Or

14 What do you understand by capital budgeting ? What is its practical utility for a large hotel ?

15 Define working capital. What factors would you take into consideration in estimating the working capital needs of a budget hotel ?

Or

16 Balance Sheet of a company as on 31.12.2018 is as follows in Table. 2 :

Table. 2

Liabilities	2009	2010	*Assets*	2009	2010
Share capital	2,00,000	2,50,000	Fixed assets	3,50,000	4,75,000
Retained earnings	1,60,000	3,00,000	Stock	1,00,000	95,000
Premium on shares	—	5,000	Bills receivable	43,000	50,000
Accumulated depreciation	80,000	60,000	Pre-paid expenses	4,000	5,000
Debentures	60,000	—	Cash balance	15,800	10,200
Accounts payable	37,800	40,200	Commission on shares	25,000	20,000
Total :	5,37,000	6,55,200		5,37,000	6,55,200

Additional information :

(i) Net income for the year Rs. 1,40,000.

(ii) Fixed assets purchases were made during the year at a cost of Rs. 1,65,000 and fully depreciated machinery costing Rs. 40,000.

(iii) Depreciation for the year Rs. 20,000.

(iv) Income tax paid was Rs. 40,000.

You are required to prepare :

(a) A statement of schedule of changes in working capital.

(b) Sources and application of funds.

17 What are the reasons for merger of companies ? Write the impact of mergers.

Or

18 What do you mean by long term financial resources ? Discuss in detail method with which you can mobilizes your financial resources.

(4 × 15 = 60 marks)

C 84656 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Mechanical Engineering

ME 14 703—COMPUTER INTEGRATED MANUFACTURING

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. How is computer numerical control distinguished from conventional NC ?
2. What are the applications where Numerical Control is most suitable ?
3. What is NC part programming ? What are its methods ?
4. Briefly explain the function of each code in this typical block of program given below.

   N005 G01 G45 X50.0 Y100.1 F300.0 S480 M03 H01 ;

5. Write short notes about optical character recognition (OCR).
6. What are the advantages of implementing Group technology ?
7. Explain briefly aboutdesign and manufacturing attributes typically included in a grouptechnology classification and coding system.
8. What are the benefits that can be expected from a successful FMS installation ?
9. Briefly explain the classification of control system in a robot.
10. Write a short note on off-line programming.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. (a) Explain the working of optical encoder used in closed loop systems with neat sketch.

Or

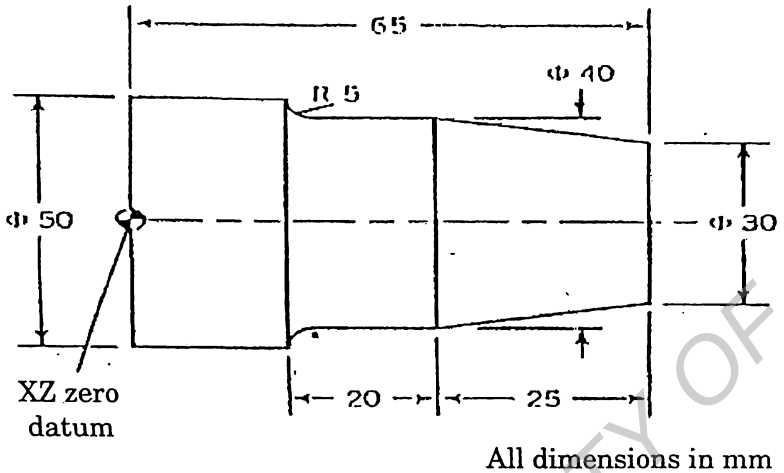
(b) Discuss the principle of operation of a numerical controlled machine.

Turn over

12. (a) Discuss briefly about manual part programming and steps in manual part programming.

Or

(b) Write an NC program to machine the aluminium part of 50mm diameter and 65 mm long shown in figure.



All dimensions in mm

13. (a) Explain the features of OPITZ classification and multi class coding system.

Or

(b) Give a brief description of AGV and AGV Unit load vehicles in relation to manufacturing industries.

14. (a) List and describe the principles of various types of sensors used in robots.

Or

(b) Explain in detail about FMS workstations.

(4 × 15 = 60 marks)

C 84655 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Mechanical Engineering

ME 14 702—MACHINE DESIGN – II

Time : Three Hours Maximum : 100 Marks

Answer **all** *the questions.*

1. (a) A multiplate clutch is to be designed to transmit a power of 50 kW at 500 rpm. Assuming suitable materials and data, determine the main dimensions of friction lining used in that clutch.

Or

(b) Design a chain drive to operate a compressor from a 15 kW electric motor at 900 r.p.m. ; The compressor is to run at a speed of 300 r.p.m. ; The minimum centre distance should be 550 mm.

2. (a) A single-row deep groove ball bearing is subjected to a radial force of 8 kN and a thrust force of 3 kN. The shaft rotates at 1200 r.p.m. The expected life of the bearing is 20,000 hours. The minimum acceptable diameter of the shaft is 75 mm. Select a suitable ball bearing for this application.

Or

(b) The following data is given for a 360° hydrodynamic bearing :

radial load = 3.2 kN

journal speed = 1490 rpm

journal diameter = 50 mm

bearing length = 50 mm

radial clearance = 0.05 mm

viscosity of lubricant = 25 cP

Assuming that the total heat generated in the bearing is carried by the total oil flow in the bearing, calculate :

(i) co-efficient of friction ;

(ii) power lost in friction ;

(iii) minimum oil film thickness ;

(iv) flow requirement in litres/min ; and

(v) temperature rise.

Turn over

3. (a) In a spur gear for a rock crusher, the gears are made of case hardened steel. The pinion is transmitting 18 kW. at 1200 r.p.m., with a gear ratio of 3.5 ; The Gear is to work 8 hrs/day for 3 years. Design the drive.

Or

(b) Design a worm gear drive to transmit 22.5 kW at a worm speed of 1440 r.p.m. Velocity ratio is 24:1. An efficiency of atleast 85% is desired. The temperature rise should be restricted to 40°C . Determine the required cooling area.

4. (a) Design a connecting rod for an I.C. engine running at 1800 r.p.m. and developing a maximum pressure of 3.15 N/mm . The diameter of the piston is 100 mm ; mass of the reciprocating parts per cylinder 2.25 kg ; length of connecting rod 380 mm; stroke of piston 190 mm and compression ratio 6 : 1. Take a factor of safety of 6 for the design. Take length to diameter ratio for big end bearing as 1.3 and small end bearing as 2 and the corresponding bearing pressures as 10 N/mm^2 and 15 N/mm^2. The density of material of the rod may be taken as 8000 kg/m^3 and the allowable stress in the bolts as 60 N/mm^2 and in cap as 80 N/mm^2. The rod is to be of I-section for which you can choose your own proportions. Use Rankine formula for which the numerator constant may be taken as 320 N/mm^2 and the denominator constant 1 / 7500.

Or

(b) Discuss the design recommendations for welded assemblies.

(4 × 25 = 100 marks)

C 84654 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Mechanical Engineering

ME 14 701—REFRIGERATION AND AIR CONDITIONING

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. A machine working on a Carnot cycle operates between 305 K and 260 K. Determine the C.O.P. when it is operated as : (i) A refrigerating machine ; (ii) A heat pump ; and (iii) A heat engine.
2. Describe about steam jet refrigeration system.
3. How does an actual vapour compression cycle differ from that of a theoretical cycle ?
4. Explain the designation system for refrigerants.
5. State the advantages of multi-stage compression over single stage compression.
6. A mixture of dry air and water vapour is at a temperature of 21°C under a total pressure of 736 mm Hg. The dew-point temperature is 15°C. Find : (i) Partial pressure of water vapour ; (ii) Relative humidity ; and (iii) Specific humidity.
7. Describe year-round air conditioning systems.
8. Explicate the factors affecting comfort air conditioning.
9. Explain the working of a rotary compressor with a neat diagram.
10. Describe the axial flow fans used in air conditioning system.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. (a) (i) A Carnot refrigerator has working temperatures of – 30°C and 35°C. If it operates with R12 as a working substance, calculate the work of isentropic compression and that of isentropic expansion, and refrigerating effect, heat rejected per kg of the refrigerant, and COP of the cycle.

Turn over

(ii) If the actual refrigerator operating on the same temperatures has a COP of 0.75 of the maximum, calculate the power consumption and heat rejected to the surroundings per ton of refrigeration.

Or

(b) An aircraft flying at an altitude of 8000 m, where the ambient air is at 0.341 bar pressure and 263 K temperature has a speed of 900 km/h. The pressure ratio of the air compressor is 5. The cabin pressure is 1.01325 bar and the temperature is 27°C. Determine the power requirement of the aircraft for pressurization (excluding the ram work), additional power required for refrigeration and refrigerating capacity on the basis of 1 kg/s flow of air.

12. (a) An ammonia refrigerating machine has working temperatures of 35°C in the condenser and – 15°C in the evaporator. Assume two cases :

(a) Dry compression, ; and

(b) Wet compression.

Calculate for each, the following :

(i) The theoretical piston displacement per ton refrigeration ;

(ii) The theoretical horsepower per ton refrigeration ; and

(iii) The co-efficient of performance.

Or

(b) In an ammonia-absorption system with an analyser but without a dephlegmator the following data are given :

Condenser pressure = 20.3 bar

Evaporator pressure = 2.1 bar

Generator temperature = 156 °C

Absorber temperature = 40 °C

Determine, per unit mass of the vapour distilled :

(i) Specific solution circulation rates.

(ii) Temperature at inlet to evaporator if the liquid from the condenser is cooled by 13 °C in the liquid-vapour heat exchanger.

(iii) The refrigerating effect if the maximum refrigeration temperature is 5 °C.

(iv) The heat transfer in the liquid-liquid heat exchanger.

(v) The heat added in the generator.

13. (a) The atmospheric air at 30°C dry bulb temperature and 75 % relative humidity enters a cooling coil at the rate of 200 m^3/min. The coil dew point temperature is 14°C and the by-pass factor of the coil is 0.1. Determine : (i) The temperature of the air leaving the cooling coil ; (ii) The capacity of the cooling coil in tones of refrigeration and in kilowatt ; (iii) The amount of eater vapour removed per minute ; and (iv) The sensible heat factor for the process.

Or

(b) A laboratory having an unusually large latent heat gain is required to be air conditioned. The design conditions and loads as follows :

Summer design conditions : 40 °C DBT, 27 °C WBT

Inside design conditions : 25 °C DBT, 50 % RH

Room sensible heat : 34.9 kW

Room latent heat : 18.6 kW

The ventilation air requirement is 85 cmm. Determine the following :

(i) Ventilation load ;

(ii) Room and effective sensible heat factors ;

(iii) Apparatus dew point and amount of reheat for economical design ; and

(iv) Supplied air quantity.

Assume a suitable bypass factor.

14. (a) Describe the following condensers :

(i) Air-cooled condensers ;

(ii) Water-cooled condensers ; and

(iii) Evaporative condensers.

Or

(b) With a neat sketch, discuss the working principle of an automatic expansion valve. Also state its applications.

(4 × 15 = 60 marks)

C 84651 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2020

Information Technology

IT 14 704 E—SOFTWARE QUALITY MANAGEMENT

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

1. Explain the role of seven quality control tools.
2. Write a note on Total quality Management, verification and validation.
3. Write a note on design control in Software Configuration Management.
4. What is the need for automated tools in software configuration Management ?
5. How is a successful inspection program initiated ?
6. What are the main standards of ISO 9000 series ? Where do you make use of these standards in software development ? Explain any one standard briefly.
7. Discuss about the different tools and techniques available for testing. How will you perform real time testing ?
8. What is sigma-Six and Quality Function Deployment ? Explain their importance in quality management.
9. Defect prevention not a new idea-Explain.
10. Discuss about the factors to be considered for defect prevention.

(8 × 5 = 40 marks)

Part B

Answer **all** *the questions.*

11 a) What are the factors to be considered before assessing a software process ? Discuss.

Or

b) Explain the goal and role of software quality assurance.

Turn over

12 a) Explain about configuration management- responsibilities, plan, accounting and auditing.

Or

b) How does a change control board controls change in the design ? Explain.

13 a) Explain about :

i) Types of review.

ii) Objectives and Basic principles of inspection.

Or

b) Explain the need for quality standards. Explain CMM, SPICE and Malcolm Baldridge Award

14 a) Explain the seven types of software tests.

Or

b) What are the various measures for software quality ? How they are used in assessing quality of software ?

(4 × 15 = 60 marks)

C 84649 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2020

Information Technology

IT 14 703—INTERNET TECHNOLOGIES

Time : Three Hours Maximum : 100 Marks

Part A (Short Questions)

Answer **eight** *questions.*
Each question carries 5 *marks.*

1. Describe the main idea of VoIP.
2. Write a brief outline about Connection Oriented Service.
3. Explain about network management.
4. Explain the concept of Access control attacks and control measures.
5. Explain about the principle of operation involved in E-distributor.
6. Describe the working principles of RTP.
7. Discuss the various types of E-commerce.
8. List the various E-Commerce site tools.
9. Define B2B and explain its working.
10. Illustrate the concept of B2C E-commerce.

(8 × 5 = 40 marks)

Part B

Answer **all** *question.*
Each question carries 15 *marks.*

11. Write short notes on Client-Server Interaction with an example.

Or

12. Explain in detail about Remote File Access with an example.

Turn over

13. Discuss about Scheduling and policing mechanisms.

Or

14. Define RSVP. Explain in detail about RSVP functions with example.

15. Explain the following ; (i) Security in E-commerce and (ii) Technology Infrastructure in E-commerce.

Or

16. Write short notes on the hardware and the software choice for the E-Commerce Application.

17. Discuss about Procurement process and Supply chain Management.

Or

18. Explain the following : (i) Net Marketers Types ; and (ii) *e*-procurement

(4 × 15 = 60 marks)

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SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2020

Computer Science Engineering

CS/IT 14 705 B—E-COMMERCE

Time : Three Hours Maximum : 100 Marks

Part A

1 Define *e*-commerce and explain its types.

2 Differentiate B2B and B2C models.

3 Explain the types of *e*-payment

4 Describe digital token based *e*-payment.

5 Discuss about electronic data interchange.

6. Elaborate the types of digital documents.

7. Why is security needed in e-commerce applications ?

8. Discuss the ethical, social and political issues in e-commerce.

9. Explain about corporate digital warehouse.

10. Explain the online content revenue models.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*

11 a) Explain B2C e-commerce of a customer reserving airline tickets from his home or work place.

Or

b) Explain B2B E-Commerce using an example of a book distributor who stocks a large number of books, which he distributes via a large network of book sellers. Assume that the distributor has stocks of books of a large number of publishers and book sellers order books as and when their stock is low. Distributors give 1 month's time to booksellers for payment.

Turn over

12 a) Define *e*-cash. Explain with an example how an online banking system works.

Or

b) Describe the functional requirements for online selling and what specialized services and servers perform these functions.

13. a) What do you understand by EDI ? Is EDI used in B2C or B2B E-Commerce ? Why is EDI important in E-Commerce ?

Or

b) Explain the workflow, automation and co-ordination of supply chain management.

14. a) What are the security issues to be taken into account while designing a security system for E-Commerce ?

Or

b) Explain the ways and means of protecting online website from hackers.

(4 × 15 = 60 marks)

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SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2020

Computer Science Engineering

CS/IT 14 705 A—SOFT COMPUTING

Time : Three Hours Maximum : 100 Marks

Part-A

Answer any **eight** *questions.*
Each question carries 5 *marks.*
Analytical / Problem solving short questions.

1. Enumerate the advantages and disadvantages of genetic algorithms.
2. Elaborate the importance of genetic algorithm in problem solving.
3. Specify the application areas of genetic algorithm;
4. List the features of back propagation networks.
5. Explain discrete and continuous Hopfield networks.
6. Tabulate the differences between classical and fuzzy sets.
7. Express the representation of union, intersection and complement operations on fuzzy sets.
8. Give a brief note on the structure of fuzzy relations.
9. Explain the types of support vector machines.
10. Write briefly about harmony search algorithm.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*
Analytical / Problem solving descriptive questions.

11. (a) Explain the types of operators in genetic algorithm.

Or

(b) Explicate the basic structure of Genetic algorithm.

Turn over

12. (a) Describe the architecture of artificial neural networks.

Or

(b) Outline the steps of Perceptron and Hebbian learning algorithm in detail.

13. (a) Discuss the applications of fuzzy sets in various fields of science and engineering.

Or

(b) Explain the significance of fuzzy sets in soft computing.

14. (a) Give the overview of Evolutionary algorithm in detail.

Or

(b) Explain any *three* swarm intelligence techniques and list the applications of swarm intelligence.

[4× 15 = 60 marks]

C 84643 (Pages : 2) Name.....

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SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2020

Computer Science Engineering

CS/IT 14 704 C—GRID COMPUTING

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

Each question carries 5 *marks.*

1. Explain about the current grid activities.
2. Write the benefits of Internet computing.
3. What do you mean by high performance computing ?
4. Write short notes on managing grid services.
5. What do you mean by desktop supercomputing ?
6. List the specifications of OSGI.
7. Explain the basic services provided by OGSA.
8. Write short notes on sceduling in Grid Computing.
9. Discuss briefly about application of Grid in life sciences.
10. Write short notes on High Level services of the GLOBUS GT3 toolkit.

(8 × 5 = 40 marks)

Part B

Answer **all** *question.*

Each question carries 15 *marks.*

11. (a) Explain with suitable diagrams, the various grid computing models.

Or

(b) Explain in detail about Risk Analysis and Grid Marketplace.

Turn over

12. (a) Discuss in detail about Native Programming for Grids.

Or

(b) Explain in detail about Grid enabling network services.

13. (a) With a neat sketch, explain in detail about technical details of Open Grid Services Infrastructure.

Or

(b) Elaborate in detail about Grid services.

14. (a) Explain in detail about Resource Management.

Or

(b) Explain in detail about high-level services of GLOBUS GT3 toolkit.

(4 × 15 = 60 marks)

C 84642 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Computer Science Engineering

CS/IT 14 704 B—DIGITAL IMAGE PROCESSING

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Write about the elements of digital image processing system.
2. Define quantization. Mention its use.
3. List the properties of DPT.
4. Explain about local enhancement technique in Histogram processing.
5. Write about the correspondence between Filtering in the spatial and frequency domain.
6. Explain about the basis of spatial filtering.
7. Compare image enhancement and restoration techniques.
8. List the applications of image restorations.
9. State the need for image compression.
10. Mention the standards used for image compression.

(8 × 5 = 40 marks)

Part B

Answer **all** *the questions.*
Each question carries 15 *marks.*

11. With the help of a block diagram, describe in detail about the fundamental steps used in image processing.

Or

12. Explain in detail about the working of the Walsh- Hadamard transforms.
13. Explain the sharpening frequency domain filters of Ideal High pass filter and Butterworth High Pass Filter.

Or

14. Discuss in detail about the basic gray level transformations.

Turn over

15. Explain the method of Least Mean Squares Filtering (Wiener) for image restoration.

Or

16. How is edge detection performed ? Write a suitable algorithm and explain the edge point linking.

17. Explain with a block diagram about transform coding system.

Or

18. Explain in detail about Lossy compression techniques.

(4 × 15 = 60 marks)

C 84641 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2020

Computer Science Engineering

CS 14 704 A—OBJECT ORIENTED MODELLING AND DESIGN

Time : Three Hours Maximum : 100 Marks

Part A

1. Differentiate between the role of actor and a user.
2. Mention the usage of objects and classes with an example.
3. What does a message represent in a sequence diagram ? Give the format for message label.
4. State the purpose of activity semantics in activity diagram.
5. Write any five points to be considered while designing a well formed class.
6. Distinguish between component and interface.
7. How does OCL bridge the gap between UML and formal languages ?
8. Write the syntax for packages in OCL.
9. What are the benefits of packages ? Explain with an example.
10. Draw a state machine model for online banking system.

(8 × 5 = 40 marks)

Part B

II. (a) Develop a use case model for library management system.

Or

(b) Discuss about the merits and limitations of single and multiple inheritances in object oriented analysis with suitable examples.

12. (a) Draw the communication diagram for college event management system and explain the same.

Or

(b) Illustrate with suitable example, relationship between sequence diagrams and use cases.

Turn over

13. (a) Develop a state-machine diagram for an automated washing machine. Make your own assumptions.

Or

(b) Develop a State Machine Diagram for an elevator system of a building. State clearly the assumptions you make about the system

14. (a) Explain in detail about types of OCL expressions with proper examples.

Or

(b) Explain in detail about Architecture Description Language (ADL).

(4 × 15 = 60 marks)

C 84640 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Computer Science Engineering

CS 14 703—ARTIFICIAL INTELLIGENCE

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Define and explain the concept of artificial intelligence.
2. What is the role of perception and action in artificial intelligence?
3. Explicate the significance of heuristic functions in searching.
4. Enumerate the differences between syntax and semantics.
5. Write short notes on Unification.
6. Explain the characteristics of neural networks.
7. Describe the process of speech recognition.
8. Explain the three basic building blocks of LISP.
9. Tabulate the differences between functional and logic programming.
10. Specify lambda expressions with an example.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. (a) Explain heuristic search in artificial intelligence and give the algorithm of A* search.

Or

(b) Discuss the characteristics and drawbacks of production systems.

Turn over

12. (a) Illustrate the procedure for conversion to Conjunctive Normal Form (CNF) by translating the sentence "Everyone who loves all animals is loved by someone".

Or

(b) Explain briefly about the need for knowledge representation in artificial , intelligence.

13. (a) Explain the phases of natural language processing with block diagram.

Or

(b) With a neat sketch, elaborate the working of back propagation neural networks.

14. (a) Discuss the features of LISP programming language and implement a LISP function to compute the factorial of a given number using recursion.

Or

(b) Explain the usage of meta predicates in Prolog with examples.

(4 × 15 = 60 marks)

C 84639 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Computer Science Engineering

CS/IT 14 702—CRYPTOGRAPHY AND NETWORK SECURITY

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. What is non-repudiation in the context of computer based communication ?
2. Discuss the concept of Caesar Cipher.
3. Highlight the working principles of the Fiestel Cipher.
4. What is meant by public key cryptosystem ? Explain its functionalities.
5. Mention the advantages and disadvantages of using the DES algorithm.
6. List the four general Characteristics of schema for the distribution of the public key.
7. Mention the role of compression function in hash function.
8. What is meant by S/MIME ?
9. Discuss in detail about the firewall mechanism.
10. Draw a neat diagram of the IP security architecture.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. Explain the Rail Fence Transposition technique with an example.

Or

12. Explain the structure of simplified DES with a neat diagram.

Turn over

13. Compare the working principles of RSA and DES algorithm.

Or

14. Explain in detail about various types of public key crypto-systems.

15. Explain the X509 authentication protocol in detail.

Or

16. Explain the digital signature mechanism in detail.

17. Describe in detail about Socket layer and transport layer security with neat diagram.

Or

18. Briefly explain about Web Security principles.

(4 × 15 = 60 marks)

C 84638 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Computer Science Engineering

CS/IT 14 701—DESIGN AND ANALYSIS OF ALGORITHM

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

1. Sort the following list using heap-sort technique L = {5, 8, 3, 9, 2, 10, 1, 40}.
2. Find the step count for the following program segment :

```
for i = 20 to 60
    for j = 1 to n
        S = S + 1;
    end
end
```

3. What is dynamic programming technique? How does it differ from divide and conquer method?
4. Given a set S = {1, 3, 4, 5} and X = 8, find subset sum using backtracking technique.
5. Consider 5 items along with their respective weights and profits. w = (5, 10, 20, 30, 40) and p = (30, 20, 100, 90, 160). Capacity of knapsack = 60. Find the optimal solution for the fractional knapsack problem.
6. Explain absolute approximation and $f(n)$ approximation.
7. Write the algorithm for approximating vertex cover.
8. Show that Clique problem is NP-Complete.
9. What is primality testing in cryptography ?
10. Write short notes on probabilistic counting.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
All questions carry equal marks.

11. (a) Show that W ($n/3$) + W ($2\,n/3$) + n is O (n log n) using recursive tree method.

Or

(b) Sort the following list in increasing order using merge sort technique. Write the algorithm and analyze the time complexity. L = (2, 23, 91, 0, 19, 26, 12).

12. (a) Devise an algorithm for n-coloring problem using backtracking technique.

Or

(b) Explain how dynamic programming is used to solve matrix-chain multiplication problem.

13. (a) Approximate the subset sum problem.

Or

(b) What is P, NP complete problems ? Explain P and NP class problems with suitable example.

14. (a) Explain Pollard's Rho method for prime factorization.

Or

(b) Explain 8 queens problem and give a randomized solution for the same.

(4 × 15 = 60 marks)

C 84626 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2020

Civil Engineering

CE 14 705D—GROUND WATER HYDROLOGY

Time : Three Hours Maximum : 100 Marks

Part A

1. What is flow net and its characteristics ?
2. What is Laplace equation ?
3. What is ground water basin ?
4. What do you understand by Theis's equation ?
5. Define Semi-Confined Aquifer.
6. Write a note on gravity well.
7. Name the general types of pumping tests.
8. Distinguish between shallow tube well and deep well.
9. What are the qualities of groundwater ?
10. Define ground water investigation.

(8 × 5 = 40 marks)

Part B

11. a) What are the various types of aquifers ? Explain.

Or

b) Discuss the occurrence and movement of ground water in detail.

12. a) Describe Chow's method for the estimation of aquifer parameters.

Or

b) Explain in brief the determination of different aquifer parameters.

13. a) Discuss different types of well construction along with their suitability.

Or

b) What is meant by well development ? Explain about the well development procedures.

14. a) Describe the electrical resistivity method for the estimation of thickness of subsurface formations in a horizontal surface.

Or

b) Write the necessity, concept and give any two different methods of artificial recharge of ground water.

(4 × 15 = 60 marks)

C 84625 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Civil Engineering

CE 14 705 B—SOIL EXPLORATION, TESTING AND EVALUATION

Time : Three Hours Maximum : 100 Marks

Part A

I. Answer any *eight* questions out of ten :

1 How do you write a soil investigation report ?

2 What is soil exploration report ?

3 What are the objectives of site exploration ?

4 How do you calculate swelling pressure in soil ?

5 How do you identify expansive soil ?

6 What type of foundation is suitable for clay soil ?

7 What is swelling index of soil ?

8 What is dynamic cone penetration test ?

9 How do you use a static cone penetrometer ?

10 What is tensile and flexural strength ?

(8 × 5 = 40 marks)

Part B

II. Answer all the questions.

11 Explain soil sampling procedures.

Or

12 What is RQD and Core recovery ?

13 Explain Soil Testing in Laboratory.

Or

14 What is shear test and explain I.T ?

Turn over

15 What is the Plate Load Test ?

Or

16 What is Static Cone Penetration Test or Cone Penetration Test ?

17 List out the laboratory tests on rocks.

Or

18 What is a Flexural Test ?

(4 × 15 = 60 marks)

C 84624 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2020

Civil Engineering

CE 14 704 E—CONCRETE TECHNOLOGY

Time : Three Hours Maximum : 100 Marks

Part A

Answer **eight** *questions.*

Each question carries 5 *marks.*

1. Define hydration of cement.
2. List out the uses of cement.
3. Mention the merits of mineral admixtures.
4. What are light weight aggregates?
5. Discuss about high density concrete.
6. What is meant by Fibre reinforced concrete ?
7. List out the factors considered in the mix design of the low strength concrete.
8. Define the term non-destructive testing.
9. Distinguish between plastic shrinkage and drying shrinkage.
10. Mention the factors affecting creep of concrete.

(8 × 5 = 40 marks)

Part B

Answer **all** *question.*

Each question carries 15 *marks.*

11. (a) Discuss in detail about the setting time of cement.

Or

(b) Define chemical admixture. Illustrate the action and interaction and their influence on properties of concrete.

Turn over

12. (a) Discuss about :

(i) No fines concrete. (7½ marks)

(ii) Foamed concrete. (7½ marks)

Or

(b) Explain about self-compacting concrete.

13. (a) Discuss in detail the ultra-sonic pulse velocity test to carry out non-destructive test on concrete.

Or

(b) Explain the procedure of Mix Design of High Strength Concrete.

14. (a) Describe in detail the importance of elastic properties of aggregate for making a good concrete.

Or

(b) Discuss the relationship between strength and durability of concrete. How it will influence the concrete.

[4 × 15 = 60 marks]

C 84622 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2020

Civil Engineering

CE 14 704 C—HIGHWAY PAVEMENT DESIGN

Time : Three Hours Maximum : 100 Marks

Part A

I. Answer any *eight* questions out of ten :

1 What is the function of sub-base ?

2 What is difference between subgrade and subcase ?

3 How climatic variation affects pavement design and performance ?

4 What is the most common test used in evaluating soil strength ? California Bearing test.

5 Wheel load on pavements.

6 What is a standard axle load ?

7 What should be the thickness of slab ?

8 What is the thinnest concrete slab ?

9 What is pavement deflection ?

10 Define : The plate load test.

(8 × 5 = 40 marks)

Part B

II. Answer *all* the questions :

11 Design of highway pavement.

Or

12 Factors affecting the highway pavements.

13 A flexible pavement has to be designed for a wheel load of 3600 kg with a tyre pressure of 4.8 kg/cm ^{2}. A plate bearing test was conducted on the sub-grade soil using a 30 cm diameter plate. After 10 recepitations of load application the pressure corresponding to 0.5 cm deflection was 2.8 kg/cm^2. Adopt Mc Leod method.

Or

14 Explain Burmister layered theory.

15 Control the corner stress by :

Gold backs and IRC formula for the pavement details given below :

Wheel load P	=	4100 kg
Modulus of elasticity, E	=	$2.10 * 10^5$ kg/ cm^2
Pavement thickness	=	20 cm
Poisson's Ration	=	0.15
Modulus of Subgrade reaction, K	=	3.5 kg/ cm^3
Radius of contact area	=	15 cm.

Or

16 Design size and spacing of dowel bars at an expansion joint of concrete pavement of thickness 25 cm. Given the radius of relative stiffness of 80 cm. design wheel load 5000 kg. Load capacity of the dowel system is 40 percent of design wheel load. Joint width is 2.0 cm and the permissible stress in shear, bending and bearing stress in dowel bars are 1000, 1400 and 100 kg/cm^2 respectively.

17 Functions and Types of pavements.

Or

18 Explain the defects in Flexible Pavements.

(4 × 15 = 60 marks)

C 83788 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC 14 704 (D)—NANOTECHNOLOGY

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Explain about NEMS.
2. Explain Bulk micromachining process.
3. Show that to study the operation of rotational microstructure, the concepts of Electromagnetic theory and classical mechanics are used ?
4. State the difference between MEMS and NEMS. Why MEMS and NEMS are difficult to classify based on their size ?
5. Explain the characteristics of nanodevices.
6. What problems are faced by motion nano devices ? Explain.
7. Bring about the characteristics of Micro-structures.
8. Explain the model parameters of single-phase reluctance motors.
9. Explain the Hamilton-Jacobi theory.
10. Explain about molecular wires.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. Explain in detail about Nano and Micro-electro mechanical systems with suitable biological concepts.

Or

12. Discuss the steps involved in the fabrication of MEMS.

Turn over

13. For a rotational microstructure derive the expression for torque, translational force, stored magnetic energy in electric and magnetic field.

Or

14. Discuss in detail about molecular wires and molecular circuits.

15. Give a detailed analysis and carbon nanotubes.

Or

16. Discuss in detail the design of MEMS actuators and sensors.

17. Derive the mathematical model of a permanent magnet DC micromachines.

Or

18. Discuss briefly about Axial topology permanent magnet synchronous micromachines.

[4 × 15 = 60 marks]

C 83690 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 09 705 L07—DIGITAL CONTROL SYSTEMS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*
Each question carries 2 *marks.*

I. 1 Define z-transforms.

2 State Initial value theorem of Z-Transform.

3 State the difference between the Jury stability test and stability analysis using bilinear transformation coupled with Routh stability criterion.

4 Give the condition for arbitrary pole placement.

5 What is Ackerman's formula ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

II. 1 Describe the sample and hold operations.

2 Explain the basic elements of a discrete-data control system.

3 State the difference between the Jury stability test and stability analysis using bilinear transformation coupled with Routh stability criterion.

4 Discuss the review of lag, lead and lead-lag compensator.

5 What are state space representations of discrete time system and Explain them ?

6 Explain the design procedure in the ω -plane.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *the questions.*

Each question carries 10 *marks.*

III. 1 Obtain the inverse z-transform of the following functions.

(i) $F(z) = 10z + \dfrac{5}{(z-2)(z-0.5)}$.

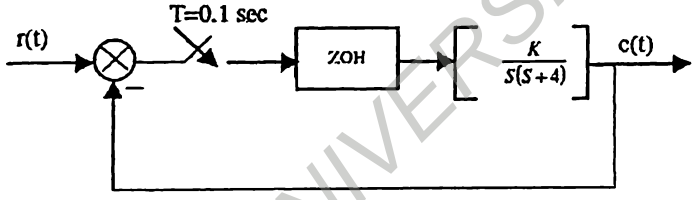
(ii) $F(z) = \dfrac{z\left(1-e^{-at}\right)}{(z-1)\left(z-e^{-at}\right)}$.

(iii) $F(z) = \dfrac{1}{(z+2)}$.

Or

2 Explain the procedure for obtaining pulse transfer function of a closed loop transfer function.

3 Sketch the root loci and find K for asymptotic stability of the following digital control system.



Or

4 Explain the design in the z-plane using the root locus diagram.

5 Find the state model for the following difference equation .Obtain different canonical forms. Also draw state diagram for each $c(k+2)+c(k+1)+c(k)=3u(k)$.

Or

6 Write the state equations and output equation of the following difference equation. $C(k+3) + 5C(k+2) + 3\,C(k+1) + 2C(k) = U(k+1) + U(k)$

7 Investigate the controllability and observability of the following system

$$x(k+1)=\begin{bmatrix}-1 & 1\\ 0 & -1\end{bmatrix}x(k)+\begin{bmatrix}0\\ 1\end{bmatrix}u(k), y(k)=\begin{bmatrix}1 & 1\end{bmatrix}x(k).$$

Or

8 Explain about the design concept of state feedback controller.

(4 × 10 = 40 marks)

C 83689 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE/PTEE 09 704—ELECTRICAL MACHINE DESIGN

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

I. 1 What are the design considerations in electrical machine design ?

2 State the significance of magnetizing current in transformers under no load conditions.

3 Define of short circuit ratio.

4 How the starting torque is improved in an Induction Motor ?

5 Mention the rules for selecting the number of rotor slots in the case of three phase squirrel cage induction motor

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

II. 1 Discuss in detail the limitations D and L in the design of DC machines.

2 Derive the expression of resistance referred to secondary of the transformer.

3 Derive the output equation of three-phase transformer.

4 Explain the advantages and disadvantage of double layer windings in synchronous machines

5 Explain the advantages and disadvantages in the selection of higher number of slots in the design of induction machine.

6 Write the short notes on : i) Cogging ii) Crawling.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *the questions.*
Each question carries 10 *marks.*

III. 1 Derive the expression for output equation of DC machine and discuss the effects of increasing the ampere conductors in detail.

Or

2 A 500kW, 500V, 375 r.p.m., 8 pole d.c. generator has an armature diameter of 110 cm and the number of armature conductor is 896. Calculate the diameter of the commutator, length of the commutator, number of brushes per spindle, commutator losses and temperature rise of the commutator. Assume single turn coils.

3 Determine the main dimensions of the core, number of turns and cross-sectional area of conductors of primary and secondary of a 125 kVA, 6600 / 460V, 50Hz, Single phase core type distribution transformer. Maximum flux density in the core is 1.2T, current density 250 A/ cm^2, Assume : a cruciform core allowing 8% for the insulation between laminations. Yoke cross- section as 15% greater than that of the core. Window height = 3 times window width, Net cross-section of copper in the window is 0.23 times the net cross-section of iron in the core, window space factor = 0.3.

Or

4 A3 phase 15 MVA, 33/6.6 kV, 50 Hz, star/delta core type oil immersed natural cooled transformer gave the following results during the design calculations. Length of core + 2 times height of yoke = 250 cm, centre to centre distance of cores = 80 cm, outside diameter of the HV winding = 78.5 cm, iron losses = 26 kw, copper loss in LV and HV windings = 41.5 kW & 57.5 kW respectively. Calculate the main dimensions of the tank, temperature rise of the transformer without cooling tubes, and number of tubes for a temperature rise not to exceed 50°C

5 A 3 phase 1800 kVA, 3.3 kV, 50 Hz, 250 rpm, salient pole alternator has the following design data. Stator bore diameter = 230 cm Gross length of stator bore = 38 cm Number of stator slots = 216 Number of conductors per slot = 4 Sectional area of stator conductor = 86 mm^2 Using the above data, calculate :

(i) Flux per pole

(ii) Flux density in the air gap

(iii) Current density

Or

6. Describe the design of field system in an Alternator.

7. Compute main dimensions D and L of a 3.7 KW, 400V, 3-phase, 4-pole, 50 Hz Squirrel cage induction motor.

   Bav = 0.45 Wb/m2.

   Electrical loading = 23000 Amp-conductors/metre

   Efficiency = 85%

   Power factor = 0.84

   Winding factor = 0.955

   Stacking factor = 0.9.

Or

8. Determine the main dimensions for a 15 HP, 400 volt, 3-phase, 4-pole, 1425 rpm Induction motor. Adopt a specific magnetic loading of 0.45 Wb/m^2 and a specific electric loading of 230 ac/m. Assume that a full load efficiency of 85% and a full load power factor of 0.88, will be obtained

(4 × 10 = 40 marks)

C 83688 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE/PTEE 09 703—DIGITAL SIGNAL PROCESSING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

I. 1 How many multiplications and additions are required to compute N -point DFT using radix - 2 FFT ?

2 State the differences and similarities between DIT and DIF ?

3 Compare symmetric and antisymmetric FIR filters ?

4 Mention the advantages of cascade realization ?

5 What is truncation ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

II. 1 Summarize the properties of DFT.

2 Perform the linear convolution of the sequence $x(n) = \{1, -1, 1, -1\}$ and $h(n) = \{1, 2, 3, 4\}$ using DFT method.

3 What is known as pre warping in digital filters ?

4 Give the steps in design of a digital filter from analog filters.

5 Explain the designing of FIR filters using windows.

6 Explain the various applications of adaptive filters.

(4 × 5 = 20 marks)

Part C

Answer **all** *the questions.*
Each question carries 10 *marks.*

III. 1 Explain the following properties of DFT : (a) Linearity ; (b) Complex conjugate property ; (c) Circular Convolution ; and (d) Time Reversal.

Or

2 Derive the butterfly diagram of 8 point radix - 2 DIF FFT algorithm and fully label it.

3 Obtain the direct form I, direct form II and cascade form realization of the following system functions :

$$y(n) = 0.1\ y(n-1) + 0.2\ y(n-2) + 3x(n) + 3.6\ x(n-1) + 0.6x(n-2).$$

Or

4 Obtain the linear phase realization of the system function :

$$H(z) = \frac{1}{2} + \frac{1}{3}z^{-1} + z^{-2} + \frac{1}{4}z^{-3} + z^{-4} + \frac{1}{3}z^{-5} + \frac{1}{2}z^{-6}.$$

5 Convert the given analog filter with transfer function H (*s*) = 2/(*s* + 1) (*s* + 2) in to a digital IIR filter using bilinear transformation. Assume T = 1 sec.

Or

6 Design a low pass Butterworth digital filter with the following specification :

$Ws = 4{,}000$, $Wp = 3{,}000$

$Ap = 3$ d B, $As = 20$ d B, T = 0.0001 sec.

7 With respect to finite word length effects in digital filters, with examples discuss about :

(i) Over flow limit cycle oscillation.

(ii) Signal scaling.

Or

8 Discuss the procedure to implement digital filter bank using multi rate signal processing ?

(4 × 10 = 40 marks)

C 83687 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE/PTEE 09 702—ANALOG AND DIGITAL COMMUNICATION

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. A 400 W carrier is modulated to a depth of 75 %. Find the total power of amplitude modulated signal with full carrier and suppressed carrier.
2. State modulation index of an FM signal.
3. Define autocorrelation and autocovariance of a random process.
4. Differentiate between ASK, FSK and PSK signals.
5. List the essential units of power line carrier system.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Explain how an envelope detector is able to demodulate AM signal ?
7. Compare and contrast Tuned Radio Frequency receiver and Superheterodyne receiver.
8. Explain the construction and working of pulse width modulator.
9. Describe sampling process, its types and the condition for-proper reconstruction of original signal from sampled signal.
10. Explain Binary FSK transmitter and receiver with neat block diagram.
11. List the various advantages and disadvantages of Power line carrier communication.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. Derive the expression for the AM modulated signal assuming a single tone modulation of the carrier signal and sketch the signal in time and frequency domain.

Or

Turn over

13. Derive the expression for a narrowband FM signal and hence draw the block diagram of a modulator used to generate narrow band FM signal.

14. Derive the expression for the power spectral density of a random process X(t) and explain its properties.

Or

15. Let X(t) be a random process transmitted through a linear time invariant filter with impulse response $h(t)$ and Y(t) be the output of the filter. Derive the relationship between X(t) and Y(t).

16. Describe pulse amplitude modulation technique neat block diagram and briefly explain its advantages and disadvantages.

Or

17. Explain Code division multiple access scheme that uses direct sequence spread spectrum technique.

18. Explain how broadband over power line communication is able to achieve high-speed digital data transmission over the public electric power distribution wiring.

Or

19. Explain the significance of Coupling equipment in a Power Line Carrier Communication system and the various modes of coupling to power lines.

(4 × 10 = 40 marks)

C 83686 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE/PTEE 09 701—POWER SYSTEM ANALYSIS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*
Each question carries 2 *marks.*

I. 1 Order the methods available for forming bus impedance matrix.

2 When will the generator bus is treated as load bus ?

3 Write boundary conditions for single line to ground faults.

4 Classify steady state stability limit. Define them.

5 What are coherent machines ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

II. 1 A generator rated 25 MVA, 11 KV has a reactance of 15 %. Calculate its p.u. reactance for a base of 50 MVA and 10 KV.

2 Compare GSM and NRM with respect to number of iterations taken for convergence and memory requirement.

3 Write short notes on automatic load dispatching.

4 Find the symmetrical components Va_1, Va_2 and Va_0 in terms of unbalanced vectors V*a*, V*b* and V*c*.

5 Discuss the factors influencing transient stability.

6 Discuss the method by which transient stability improved.

(4 × 5 = 20 marks)

Turn over

Part C

Answer any **four** *questions.*
Each question carries 10 *marks.*

III. 1 The parameter of a 4 bus system are as under :

Line Starting Line Ending Line impedance Line charging admittance :

Bus	*bus*		
1	2	$0.2 + j\,0.8$	$j\,0.02$
2	3	$0.3 + j\,0.9$	$j\,0.03$
2	4	$0.25 + j\,1.0$	$j\,0.04$
3	4	$0.2 + j\,0.8$	$j\,0.02$
1	3	$0.1 + j\,0.4$	$j\,0.01$

Draw the network and find admittance matrix.

Or

2 (i) Explain the structure of modern power system with neat sketch. (5 marks)

(ii) Describe about representation of loads. (5 marks)

3 Write short notes on the following :

(i) Load frequency control. (5 marks)

(ii) Automatic Voltage regulation. (5 marks)

Or

4 The fuel inputs per hour of plants 1 and 2 are given as :

$F_1 = 0.2\,P_1^2 + 40P_1 + 120$ Rs./hr.

$F_2 = 0.25P_2^2 + 30P_2 + 150$ Rs./hr.

Determine the economic operating schedule and the corresponding cost generation. The maximum and minimum loading on each unit is 100 MW and 25 MW. Assume the transmission losses are ignored and the total demand is 180 MW. Also determine the saving obtained if the load is equally shared by both the units.

5 Show the expression for fault current in double line to ground fault on unloaded generator. Draw an equivalent network showing the inter connection of networks to simulate double line to ground fault.

Or

6 A 3 phase transmission line operating at 33 kV and having resistance of 5 Ω and reactance of 20 Ω is connected to the generating station through 15,000 KVA step up transformers. Connected to the bus bar are two alternators one of 10,000 KVA with 10 % reactance and another of 5,000 KVA with 7.5 % reactance. Draw the single line diagram and calculate the short circuit KVA for symmetrical fault between phases at the load end of the transmission line.

7 A generator is operating 50 Hz, delivers 1.0 p.u power to an infinite through a transmission circuit in which resistance is ignored. A fault taken place reducing a maximum power transferable to 0.5 p.u. Before the fault, this power was 2.0 p.u and after the clearance of the fault it is 1.5 p.u. By using equal area criterion,determine the critical clearing angle.

Or

8 Interpret the computation algorithm for obtaining swing curves using modified Euler's method.

(4 × 10 = 40 marks)

C 83685 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2009 SCHEME) EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC/PTEC 09 706 L 25—BIOMEDICAL INSTRUMENTATION

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

1. Differentiate between polarisable and non-polarisable electrodes.
2. What is need for electrode paste or jelly ?
3. Define residual volume.
4. What are pressure limited ventillators ?
5. What is a macroshock ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

1. Explain preamplifier employed in ECG.
2. Draw a typical ECG waveform and mark parts with their amplitude and frequency.
3. Write short notes on chamber plethysmography.
4. Mention the therapeutic applications of LASER.
5. What are cardioconverters ?
6. What are microshock hazards ?

(4 × 5 = 20 marks)

Part C

Answer **one** *question from each module.*

MODULE I

I. (a) Draw the block diagram of an ECG machine and explain its parts. (10 marks)

Or

(b) Explain in detail about needle electronics and micro-electrodes. (10 marks)

Turn over

MODULE II

II. (a) Explain the method of determining blood flow using indicator dilution technique. (10 marks)

Or

(b) Explain the measurement of lung volumes and lung capacities using a spirometer. (10 marks)

MODULE III

III. (a) Explain the working principle of a shock wave lithotripsy unit with a neat block diagram. (10 marks)

Or

(b) Explain the working principle of a hemo dialyser with a neat block diagram. (10 marks)

MODULE IV

IV. (a) Explain in detail about line isolation monitors and ground fault interrupters. (10 marks)

Or

(b) Discuss the measurement of PO_2 with a neat sketch. (10 marks)

(4 × 10 = 40 marks)

C 83684 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC 09 706 L06—SOFT COMPUTING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Discuss about Perceptron Networks.
2. List the applications of neural networks.
3. Describe about Quick prop training
4. Define Defuzzification.
5. Write the Pseudo code of Genetic Algorithm.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Describe about Mc-Culloch Pitts Neuron in Artificial Intelligent systems.
7. Write short notes on decremental iteration procedure.
8. Explain the various methods of FIS with neat diagram.
9. State and explain about Roulette Wheel Selection.
10. Explain the construction and working principle of Fuzzy Inference Systems.
11. Compare Formation of rules and Decomposition of rules.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. a) Describe briefly about Fundamental models of ANN with examples.

Or

b) Explain about Artificial Neural Networks and Biological neural networks.

13. a) Draw the architecture and explain the algorithm of Back Propagation Networks.

Or

b) State and explain Perception Convergence Theorem.

14. a) Draw the architecture and explain about the operations of FLC System.

Or

b) Write short notes on fuzzy rule base and approximate reasoning in fuzzy sets.

15. a) How Travelling Salesman Problem can be solved using GA ? Describe the operation performed in different phases using suitable example.

Or

b) Write short notes on Generation gap and steady state replacement in Inheritance operators.

(4 × 10 = 40 marks)

C 83683 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2009 SCHEME) EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC 09 705 L16—EMBEDDED SYSTEMS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

1. State the need for watchdog timer in an embedded system.
2. How does a decoder help in memory and I/O devices interfacing ?
3. Why does an OS function provide two modes, user mode and supervising mode ?
4. What is Harvard architecture ?
5. State the purpose of cross compiler.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

6. Bring about the features and applications of Embedded processor for a complex system.
7. Explain the different program layers in the embedded software.
8. Explain about task and task states.
9. How timer/clock initialization is done in PIC ?
10. Explain about assembler.
11. How to interface an LED and switch to a microcontroller.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*

12. Discuss the classification of Embedded system.

Or

13. Discuss the application of Embedded systems in consumer Electronics and communication devices.
14. Describe in detail real time embedded OS.

Or

15. Explain about OS security and Interrupt routines in an RTOS environment.

Turn over

16. Explain about timers and high speed I/O of 8096.

Or

17. With suitable figure explain the Architecture of AVR 8515 microcontroller.

18. With suitable circuits explain how LCD, and stepper motor are interfaced with microcontroller.

Or

19. How ADC and temperature sensor is interfaced with microcontroller.

(4 × 10 = 40 marks)

C 83682 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC/PTEC 09 705 L15—TELEVISION AND RADAR ENGINEERING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

Each question carries 2 *marks.*

1. Define aspect ratio.
2. What is the difference between blanking pulses and sync pulses ?
3. List the primary and secondary colors.
4. What is maximum unambiguous range of radar ?
5. List any two benefits of pulse Doppler radars.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

Each question carries 5 *marks.*

6. Draw composite video signal wave form and mark the signals.
7. Brief the standard scanning sequence used in television.
8. What are the features of color TV systems that make it compatible with monochrome system ?
9. Mention the advantages of in-line cathode.
10. Write notes on frequencies used for radars.
11. Mention the tracking techniques in radar systems.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (a) Explain the need of VSB in picture transmission in a TV system.

Or

(b) Draw the block diagram of a monochrome picture tube and explain its working.

13. (a) Explain, how luminance and colour difference signals are developed from camera outputs ?

Or

(b) Explain, how pin cushion corrections are carried out in color TVs ?

14. (a) Draw the block diagram of a simple pulse radar and explain.

Or

(b) Explain the Doppler effect.

15. (a) Describe the principle of operation of simple CW radar.

Or

(b) Draw a block diagram of a frequency modulated CW radar and explain.

(4 × 10 = 40 marks)

C 83681 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC 09 705 L14—INTERNET TECHNOLOGY

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1) Define 'HTTP'.
2) Write any two differences between TCP and UDP.
3) What is 'multimedia' ?
4) Bring out the need for network security.
5) Write any two benefits of adhoc networks.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6) Write notes on streaming stored audio and video.
7) Discuss about RTP scheduling mechanisms.
8) Explain the different types of viruses.
9) Mention the characteristics of trusted systems.
10) Brief about implications of TCP over mobility.
11) Mention the applications of Wireless Telephony.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12) (a) Explain socket programming using TCP and UPD.

Or

(b) Discuss about the process of webpage design using HTML and XML.

Turn over

13) (a) Discuss in detail about integrated network management framework.

Or

(b) Elaborate on differentiated services in RSVP.

14) (a) Describe the security and authentication features of SET Protocol with suitable diagrams.

Or

(b) Discuss about working of SSL and transport layer security.

15) (a) Explain in detail about indirect TCP and snooping TCP.

Or

(b) Describe transaction-oriented TCP support for mobility.

(4 × 10 = 40 marks)

C 83680 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC/PTEC 09 704—DIGITAL SYSTEM DESIGN

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Define Race Condition.
2. What is meant by Behavioural Modelling ?
3. Draw a general circuit for PAL.
4. What is meant by CPLD ?
5. Define Hazard.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Differentiate between Mealy and Moore machine with suitable examples.
7. With suitable examples explain various data objects in VHDL.
8. Write a VHDL code for half adder in structural modelling.
9. What is meant by sequential PLD ? Explain with a diagram.
10. What are the resources available in a FPGA device ? Give the functions of each.
11. What is meant by Clock Skew ? Explain with necessary timing diagrams.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (a) Design a 3-bit up/down counter with mode control using SM.

Or

(b) Design a control circuit for controlling traffic in a 4-way junction using SM.

13. (a) Explain VHDL procedures. How a procedure is declared ? Use suitable examples.

Or

(b) Explain the syntax of declaring a Function in a VHDL module. Use suitable examples for the same.

14. (a) Explain the architecture of XC 4000 FPGA with necessary diagrams.

Or

(b) Explain the design of sequential circuit using CPLD and give CPLD implementation of a shift register.

15. (a) With a neat timing diagram, explain how Hazards affect the function of a synchronous circuit.

Or

(b) What is meant by metastability ?

Explain 1-FF, 2-FF and 3-FF synchronizer with necessary diagrams.

(4 × 10 = 40 marks)

C 83679 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC/PTEC 09 703—ANALOG AND MIXED MOS CIRCUITS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. What is the significance of a switched capacitor circuit ?
2. Derive an expression for output resistance of a simple current mirror.
3. Briefly explain the operation of Gilbert cell.
4. Explain the principle of sample and hold circuit.
5. Explain the necessity of preamplification stage in CMOS comparator design.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Explain the miller compensation in two stage operational amplifiers.
7. Explain the influence of clock feedthrough on a non-inverting switched capacitor amplifier.
8. With necessary circuit diagram and waveforms explain XOR phase detector.
9. Discuss switched capacitor implementation of ladder filters.
10. Calculate the small-signal output resistance of the current sink.
11. With a neat figure explain a basic charge pump PLL.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. a) Discuss the small signal model of a MOS transistor with relevant equations.

Or

b) Explain in detail about bandgap reference circuit.

Turn over

13. a) Derive the frequency response of a differential amplifier.

Or

b) Discuss the various architectures proposed to design a high gain amplifier.

14. a) Describe the design of a two stage CMOS operational amplifier.

Or

b) Explain the compensation techniques used in operational amplifiers.

15. a) Explain current starved VCO with a neat circuit diagram.

Or

b) Explain the non-ideal effects in PLL.

(4 × 10 = 40 marks)

C 83678 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC/PTEC 09 702—MICROWAVE ENGINEERING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Draw the diagram of a Magic Tee.
2. Define the S-parameters for a Two-port Network.
3. What is meant by Gunn Effect ?
4. Give one application for PIN diode.
5. Give the function of a Strip Line.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Explain the principle of :
   (a) Isolators. (b) Circulators.
7. Prove that the S-Matrix for a reciprocal network is symmetric.
8. What is the principle of operation of a Klystron ?
9. What is meant by Avalanche effect ? Explain with an example.
10. Explain the principle of operation of a Schottky Diode.
11. What is the technology of Hybrid MICs ? Compare with that of Monolithic MICs.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (a) (i) Explain the transmission matrix for two port networks. (5 marks)

(ii) Formulate the S-matrix for n-port network. (5 marks)

Or

(b) Explain the transmission matrix for a cascade connection of two-port networks.

13. (a) Explain the oscillation mechanism and the electron trajectory concept of Magnetron Oscillator.

Or

(b) Explain the principle of operation of Reflex Klystron Oscillator with a neat diagram.

14. (a) With a neat diagram, explain the working of IMPATT diodes.

Or

(b) With neat diagrams, explain the operation of Tunnel Diode and Varactor Diode.

15. (a) With a neat diagram, explain the VSWR measurement.

Or

(b) Explain the function of a microwave repeater with a neat block diagram.

[4 × 10 = 40 marks]

C 83677 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC/PTEC 09 701—INFORMATION THEORY AND CODING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

Each question carries 2 *marks.*

1. Find the information associated with the throwing of a fair dice once.
2. State Shannon's Source Coding Theorem.
3. List the properties of commutative ring.
4. What do you mean by dual code ?
5. List the techniques used for decoding Convolutional code.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

Each question carries 5 *marks.*

1. A black and white TV picture consists of 525 lines of picture information. Assuming each line consist of 525 picture elements, each element having 256 brightness level and the pictures are repeated at 30 per second. Calculate average information conveyed by the TV set to the viewer.
2. (a) Find the capacity of Binary Symmetric channel (BSC).

   (b) Find the capacity of BSC if BSC has an error probability of 0.1.
3. Distinguish between abelian group and commutative ring.
4. Consider a generator matrix for a (6, 3) linear block code given below :

$$G = \begin{bmatrix} 1 & 0 & 0 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 & 1 & 0 \end{bmatrix}$$

   (a) Find H matrix.

   (b) Find all code vectors.

Turn over

5. Find G matrix and H matrix for (3, 1) repetition code.

6. Briefly describe the Viterbi algorithm for the decoding of convolutional code.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

1. Consider a discrete memoryless source with 8 symbols with probabilities 0.25, 0.2, 0.15, 0.15, 0.1, 0.05, 0.05 and 0.05 respectively. Construct two Huffman code as directed :

   (a) Place the composite symbol as low as possible.

   (b) Place the composite symbol as high as possible.

   Which scheme is better ?

Or

   (a) Prove that upper bound on entropy $H(S) \leq \log_2 M$ where M is the number of messages emitted by the source.

   (b) Consider a telegraph source having two symbols dot and dash. The dot duration is 0.2 sec and dash duration is 3 times that of dot. The probability of dot occurring is twice that of dash and time between the symbol is 0.2 second. Calculate the entropy rate of the telegraph source.

2. (a) Write a short note on reed Solomon code.

   (b) Write a short note on BCH code.

Or

   (a) Give the properties of Integral domain and also give an example.

   (b) Give the properties of field.

3. A systematic (6, 3) block code has the Generator matrix given below : (i) Construct the standard array ; (ii) Determine correctable error pattern and their syndrome ; and (iii) Give the correct codeword if the received vector is 101110, 101101, 000110.

$$G = \begin{bmatrix} 1 & 0 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 1 & 0 & 1 \end{bmatrix}$$

Or

A message 101101 is to be transmitted in cyclic code with a generator polynomial $g(X) = X^4 + X^3 + 1$.

(i) Obtain the transmitted codeword.

(ii) How many parity bits do the encoded message contains ?

4. A convolutional code is described by $g^1 = [100], g^2 = [101], g^3 = [111]$.

(a) Draw the encoder for the corresponding to this code.

(b) Draw state diagram.

(c) Decode the transmitted sequence 101001011110111.

Or

A convolutional code is described by $g^1 = [110], g^2 = [101], g^3 = [111]$.

(a) Draw the encoder for the corresponding to this code.

(b) Find the output sequence for m = 10111 using code tree.

(4 × 10 = 40 marks)

C 83676 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

INFORMATION TECHNOLOGY

IT 09 702—NATURAL LANGUAGE PROCESSING AND KNOWLEDGE BASED SYSTEMS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. List the issues with NLP.
2. Define precision and recall.
3. What is the problem with Laplace smoothing ? How is it addressed by the Good-Turing estimate ?
4. Define semantics of a natural language utterance.
5. State why production rules of zero probability are a problem.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. How is the natural language processing system evaluated ?
7. Explain the different levels of knowledge representation.
8. Differentiate deterministic and non-deterministic parsers.
9. Describe the architecture of knowledge based systems.
10. Explain semantic web search with an example.
11. Elucidate on the desirable properties of formal languages to be used for representing the information in natural language.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (a) Explain with a neat diagram, the steps in natural language processing.

Or

(b) Explain top-down and bottom-up parsing.

13. (a) Draw and explain shift reduce parsing in natural language processing.

Or

(b) Given the grammar and lexicon below, show the final chart for the following sentence after applying the bottom-up chart parser. Remember that the final chart contains all edges added during the parsing process. You may use either the notation from class (i.e. nodes/links) or the notation from the book to depict the chart :

S → VP
VP → Verb NP
NP → NP PP
NP → Det Noun
PP → Prep Noun
Det → the
Verb → Find
Prep → in
Noun → men | suits

Find the men in suits.

14. (a) Elucidate on the match resolve act cycle of the production systems with example.

Or

(b) How is the knowledge represented in semantic networks? Also, explain the different type of semantic networks.

15. (a) Given two jugs, a 4-gallon and 3-gallon having no measuring markers on them. There is a pump that can be used to fill the jugs with water. How can you get exactly 2 gallons of water into 4-gallon jug ? Give the state space search problem for this.

Or

(b) Discuss the major activities in blackboard models.

(4 × 10 = 40 marks)

C 83675 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Information Technology

IT 09 701—COMPUTER GRAPHICS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. What is meant by emissive and non-emissive displays ?
2. When to use a pie chart ?
3. List out various text clipping.
4. What is B-spline ?
5. What is projection reference point ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Explain rubber band methods.
7. Explain color CRT monitors.
8. Write steps of DDA algorithm.
9. Give a detailed account on spline representation.
10. Write short notes on conics and curves.
11. Give the effects of translating the object.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. Explain direct view storage tubes.

Or

13. Give a detailed account on the parametric representation of line segment.

Turn over

14. Describe about the elimination of visible and invisible lines.

Or

15. Describe about clipping operations.

16. Elucidate on B-spline curve.

Or

17. Elaborate on Bresenham's circle drawing algorithm.

18. Explain 3D graphics.

Or

19. Describe Hidden surface removal.

(4 × 10 = 40 marks)

C 83674 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Computer Science Engineering

CS 09 706 L19—SOFT COMPUTING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

Each question carries 2 *marks.*

1. Define soft computing.
2. What do you mean by artificial neural network ?
3. What is the main difference between probability and fuzzy logic ?
4. Define cross over point.
5. List the advantages of neural network.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

Each question carries 5 *marks.*

6. Explain the operators in GA.
7. State the importance of GA with example.
8. List the characteristics of unsupervised learning.
9. Write short notes on fuzzy relations.
10. Define membership function. State its importance in fuzzy logic.
11. Mention the advantages of SVM.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (a) Explain the working of simulated annealing with example.

Or

(b) Discuss the major goals of GA. Also brief the design issues in it.

13. (a) Explain briefly about competitive networks with example.

Or

(b) Write notes on Hopfield network along with its limitations.

14. (a) Explain the major applications of fuzzy relations.

Or

(b) Explain the operation on fuzzy sets with examples.

15. (a) Explain in detail about SVM applications with examples.

Or

(b) Discuss the role of Harmony search in Problem solving.

(4 × 10 = 40 marks)

C 83673 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Computer Science Engineering

CS 09 706 L14—INFORMATION THEORY AND CODING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*
Each question carries 2 *marks.*

1. What is the significance of information rate of a source ?
2. What is a binary symmetric channel ?
3. What is the minimum distance of a block code ?
4. Write the significance of Reed-solomon codes
5. Mention the types of convolutional codes.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Derive the expression for entropy. What does it signify for a source that is emitting symbols ?
7. State and explain channel capacity theorem.
8. Describe standard array and syndrome decoding.
9. Write the steps involved in encoding of cyclic codes.
10. Construct the group under modulo-6 addition.
11. Explain about the different types of representations of convolutional encoders.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. An information source produces a sequence of independent symbols having the following probabilities. Construct binary code using huffman encoding and find its efficiency :

A	B	C	D	E	F	G
1/3	1/27	1/3	1/9	1/9	1/27	1/27

Or

13. Consider the following source S = {A, B, C, D, E} with probabilities P = {0.5, 0.25, 0.125, 0.0625, 0.0625}. Find the code words for the symbols using Shannon encoding algorithm. Also find the source efficiency and redundancy.

14. Write a note on error detecting and error correcting capabilities of a block code.

Or

15. Consider an (n, k) linear code C whose generator matrix G contains no zero column. Arrange all the code words of C as rows of a 2^k-by-n-array :

    i) Show that no column of the array contains only zeros.

    ii) Show that each column of the array consists of 2^{k-1} zeros and 2^{k-1} ones.

    iii) Show that the set of all codewords with zeros in a particular component position forms a subspace of C. What is the dimension of this subspace ?

16. Construct the prime field GF (1 1) with modulo-11 addition and multiplication. Find all the primitive elements, and determine the order of other elements.

Or

17. Construct the vector space of all 3-tuples over GF(3). Form a two dimensional subspace and its dual space.

18. Consider the (3, 1, 2) non-systematic feedforward encoder with :

$g^{(0)} = (1\,1\,0)$
$g^{(1)} = (1\,0\,1)$
$g^{(2)} = (1\,1\,1)$

    i) Draw the encoder block diagram.

    ii) Find the time domain generator matrix G.

    iii) Find the codeword v corresponding to the information sequence u = (1 1 1 0 1).

Or

19. Write a note on optimal decoding of convolutional codes.

(4 × 10 = 40 marks)

C 83671 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Computer Science Engineering

CS 09 705 L07/IT 09 705 L23—DISTRIBUTED SYSTEMS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 marks.

I. (A) Differentiate a centralized system and a distributed system.

(B) Define Scalability.

(C) What is meant by distributed mutual exclusion ?

(D) What is the domain name system ?

(E) What is meant by process migration ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 marks.

II. (A) Describe the different types of switching used in computer networking.

(B) What are the two modes of synchronization ? Write their format.

(C) Differentiate between synchronous and asynchronous communication with examples.

(D) List the issues relating to datagram communication.

(E) What is voting protocol? Compare and contrast Static and Dynamic vote protocols

(F) Describe the limitations of distributed system.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

III. (A) Explain the various challenges of a distributed computing environments (DCE).

Or

(B) Discuss the major goals and design of a distributed system concept.

IV. (A) Describe in detail about concurrent programming languages.

Or

(B) Discuss the design and synchronization issues of concurrent process in a distributed system.

V. (A) Discuss in detail about transaction communication in inter process communications.

Or

(B) Discuss the name and directory services in a distributed system.

VI. (A) Explain in detail about static process scheduling with an example.

Or

(B) Explain briefly about distributed shared memory.

(4 × 10 = 40 marks)

C 83670 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Computer Science Engineering

CS/IT/PTCS 09 704—CRYPTOGRAPHY AND NETWORK SECURITY

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

I. (a) List the attacks that threaten the integrity of information.

(b) Give an example for rail fence cipher.

(c) Find the GCD of 2740 and 1760 using Euclidean algorithm.

(d) What is IP address spoofing ?

(e) List the types of firewall.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

II. (a) Show how S-DES transformed into many variants like DES, 2-DES, 3-DES etc.

(b) Briefly explain any *three* security services.

(c) In RSA, given the product of prime numbers N = 221 and the Encryption key E = 5, find the decryption key.

(d) In Pretty Good Privacy (PGP) explain how users A and B exchange the secret key for encrypting messages.

(e) Write the verification process of Digital signature Algorithm (DSA).

(f) Describe the purpose of SSL alert protocols.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*

Each question carries 10 *marks.*

III. (a) Show how Substitution - Permutation network used in DES Algorithm. Also explain the Encryption and Decryption process.

Or

(b) What are Substitution and Transposition ciphers ? Explain any *two* methods under each category

IV. (a) Users A and B use the Diffie Hellman key exchange technique a common prime $q = 11$ and a primitive root = 7.

(i) If user A has private key $X_A = 3$, what is A's public key Y_A ? (4 marks)

(ii) If user B has private key $X_B = 6$, what is B's public key Y_B ? (4 marks)

(iii) What is the shared secret key ? Also, write the algorithm. (2 marks)

Or

(b) Explain ECC encryption and decryption process. For the elliptic curve E_{11} (1, 6), base point G = (2, 7) Compute multiples of G from 2G to 4G.

V. (a) Describe direct and arbitrated scheme of digital signature function.

Or

(b) How will you find a message digest using SHA Algorithm ? Explain.

VI. (a) Explain the firewall configurations in detail.

Or

(b) Describe Secure Electronic Transactions (SET) in detail.

[4 × 10 = 40 marks]

C 83669 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Computer Science Engineering

CS/PTCS 09 703—INTERNET TECHNOLOGY

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Define DNS. Mention its usage.
2. What is meant by multimedia networking ?
3. Differentiate between block cipher and stream cipher.
4. What is the difference between message confidentiality and message integrity ?
5. What is meant by B2B ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Explain the working principle of Electronic Mail in the Internet environment.
7. Explain about the best effort IP service and mention its limitations.
8. Consider an 8-block cipher. How many possible input blocks does this cipher have ? How many possible mappings are there ? If we view each mapping as a key, then how many possible keys does this cipher have ?
9. Explain the types of E-Commerce with an example for each.
10. Differentiate the working of TCP and UDP mechanism.
11. Explain the working of Differentiated Services.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*

Each question carries 10 *marks.*

12. (a) How is socket programming done with TCP ? Explain with an example.

Or

(b) Explain in detail the working of FTP.

13. (a) Explain UDP and HTTP streaming in multimedia networking.

Or

(b) Write about the working principle of the protocols used for real-time interactive applications in multimedia networking.

14. (a) Explain in detail about message integrity and digital signatures.

Or

(b) Write in detail about the principles and working of the Cryptography.

15. (a) Explain in detail about trends in supply chain management.

Or

(b) Write in detail about the principle operations involved in e-procurement and e-distributors.

(4 × 10 = 40 marks)

C 83668 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Computer Science Engineering

CS/PTCS 09 702—DESIGN AND ANALYSIS OF ALGORITHMS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*
Each question carries 2 *marks.*

1. Find θ notation for the following function : $65n^2 + n + 1$.
2. Solve the recurrence

   $T(n) = 3T(n/2) + n$, $n >= 1$ with initial condition and $T(0) = 0$.
3. What is dynamic programming technique ? How does it differ from divide and conquer method ?
4. Define NP class.
5. How will you verify matrix multiplication ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Using accounting method, find the amortized cost for Enqueue and Dequeue operation in a queue.
7. Sort the following list using heap-sort technique. L = {5, 8, 3, 9, 2, 10, 1, 40}.
8. Given a set S = {1, 3, 4, 5} and X = 8, find subset sum using backtracking technique.
9. Write the algorithm for approximating vertex cover
10. Show that Clique problem is NP-Complete.
11. What is primality testing in cryptography ?

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. Sort the following list in increasing order using quick sort technique. Write the algorithm and analyze the time complexity. L = (12, 35, 90, 0, 16, 27, 11).

Or

Turn over

13. Show that W(n/3) + W(2n/3) + n is O (n log n) using recursive tree method.

14. Given the characters set S = {a, b, c, d, e, f} with the following probability of occurrence P = {1, 1, 2, 3, 5, 8}, build a binary tree according to greedy strategy.

Or

15. Devise an algorithm for n-coloring problem using backtracking technique.

16. What is bin-packing problem ? Explain with an example.

Or

17. Approximate the subset sum problem.

18. Explain pollard's Rho method for prime factorization.

Or

19. Discuss about Las Vegas algorithms and their applications in cryptography.

(4 × 10 = 40 marks)

C 83667 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Computer Science Engineering

CS/PTCS 09 701—WIRELESS NETWORKS AND MOBILE COMMUNICATION SYSTEM

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. What do you mean by Handoff ?
2. Write the significance of using third generation wireless system.
3. Define signal system.
4. Explain GSM.
5. Describe the features of WAP.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Write a note on cordless telephony.
7. Explain the working of message routing technique.
8. Write about the working of GSM.
9. Explain about the functional groups of the General Packet Radio Service.
10. Mention about the popular cellular telephony networks.
11. Write a note on Radio Resource Allocation.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12 a) Explain in detail about Roaming management and Handoff management.

Or

b) Explain about PCS architecture with a neat diagram.

13. a) Discuss hoe PCN/PSTN call control is performed using ISUP.

Or

b) Elaborate Cellular Digital Packet Data Architecture with a neat diagram.

14 a) Explain in detail about Mobility management in GSM.

Or

b) Describe the process of GSM SMS service.

15. a) With a neat diagram explain the working of GPRS network interfaces.

Or

b) Write about the architecture of General Packet Radio Service.

(4 × 10 = 40 marks)

C 83666 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Civil Engineering

CE/PTCE 09 706 L20—GROUND WATER HYDROLOGY

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Define Aquifer.
2. What is meant by pumping test ?
3. What do you understand by the term tube wells ?
4. How you will measure the water quality ?
5. Draw the shallow tube well.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Write about the origin of ground water.
7. List out the types of aquifer in detail.
8. What are the reasons for failure of tube wells ?
9. Briefly discuss about artificial recharge.
10. What is the effect of seepage under dam ?
11. Discuss about draw down test.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (a) Explain about flow net in detail.

Or

(b) With neat sketches discuss about aquifers.

13 . (a) Describe in detail about types of wells in detail.

Or

(b) Write short notes on pumping test with sketches.

14. (a) Discuss in detail about method of construction of wells.

Or

(b) Discuss in detail about infiltration gallery.

15. (a) Write in detail about geographical investigation.

Or

(b) Explain about seismic refraction method and electrical resistivity method.

(4 × 10 = 40 marks)

C 83665 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Civil Engineering

CE 09 706 L17—ARCHITECTURE AND TOWN PLANNING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Define the term Aesthetics and discuss few points.
2. List out the functional planning of buildings.
3. Define town planning.
4. What is land acquisition ?
5. Mention the general requirements of site.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Differentiate between balance and symmetry.
7. What is site design planning ?
8. What do you mean by zoning in town planning ?
9. What do you mean by base map ?
10. Enumerate about Space in architecture.
11. Mention the features of town planning.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. a) Explain any five principles involved in an architectural design.

Or

b) Discuss any five basic elements in architectural design.

Turn over

13. a) Describe about the computer aided design and drafting.

Or

b) Explain in detail about site plans and why need to select site plans.

14. a) Explain the various principles of functional planning of buildings.

Or

b) Define Development plan or Master plan. Discuss the main objects of development plan for the town.

15. a) Write short notes on : i) causes of urban growth ; ii) slum clearance schemes.

Or

b) Write short notes on : i) standards of roads and paths ; ii) Provision of urban growth.

(4 × 10 = 40 marks)

C 83664 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Civil Engineering

CE 09 706 L14—SOIL EXPLORATION, TESTING AND EVALUATION

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*
Each question carries 2 *marks.*

1. What do you understand by the term Soil Exploration ?
2. Define Specific Gravity.
3. What is meant by permeability ?
4. List out the test available for rocks.
5. Define rock core recovery.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Draw a bore log report and explain about its features.
7. Differentiate compaction from consolidation.
8. Write short notes on vane shear test.
9. Explain about shear strength test in detail.
10. Write notes on spacing and number of bore holes.
11. Write the procedure for specific gravity in detail.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (a) Explain geophysical methods of soil exploration in detail.

Or

(b) Explain about methods of sampling in detail.

Turn over

13. (a) Write a detailed note on constant head permeability test with neat sketches.

Or

(b) Write a detailed note on falling head permeability test with neat sketches.

14. (a) With neat sketches explain about plate load test in detail.

Or

(b) With neat sketches explain about standard penetration test in detail.

15. (a) Explain about laboratory tests for rocks.

Or

(b) Explain about rocks in detail.

(4 × 10 = 40 marks)

C 83663 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Civil Engineering

CE 09 705 L10—HIGHWAY PAVEMENT DESIGN

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. What are the component parts of pavements ?
2. What is wheel load stress ?
3. What is the use of CBR value ?
4. Discuss the function of joints in cement concrete pavements.
5. Define pavement evaluation.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Explain the role of moisture and temperature on pavements.
7. Write the assumptions made in Burmister's two layered theory.
8. Discuss about the frictional stresses.
9. Discuss about surface distress.
10. What is Vehicle Damage Factor ?
11. Mention the failures of wearing causes in flexural pavement.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12 a) Explain the basic steps involved in the design of pavement by Marshall method.

Or

b) i) Differentiate between highway and airfield pavements.

ii) List the various factor to be considered in the design of pavements.

13. a) i) Classify the various design methods for flexible pavement.

ii) What is the purpose of dowel bars ?

Or

b) i) What are group index in flexible pavement ?

ii) What is the importance of CBR value ?

14. a) Discuss the longitudinal, contraction and expansion joints.

Or

b) How will determine the thickness of pavement by design wheel load.

15. a) List out the structural and functional requirements of flexible and rigid pavements.

Or

b) Explain the principle and uses of Benkelman test.

(4 × 10 = 40 marks)

C 83662 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Civil Engineering

CE/PTCE 09 704—CONSTRUCTION ENGINEERING AND MANAGEMENT

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

I. a) Define time-cost tradeoff.

b) Define Slack.

c) What is earnest money deposit ?

d) What is pile cape ?

e) What are different types of inventory ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

II. a) What is the concept of ethics ?

b) List the five important equipments used for excavation and explain briefly.

c) With the help of an illustrative example, explain the resources smoothing method.

d) Explain tender document and general information to be furnished in such document.

e) What are the roles of a professional bodies ?

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

III. a) The following tables gives the activities in a construction project and other relevant information :

Activity	:	1 - 2	1 - 3	2 - 3	2 - 4	3 - 4	4 - 5
Duration in days	:	18	20	10	10	6	10

Turn over

Draw the network for the project. (4 marks)

Determine the critical path. (4 marks)

Find the free float. (2 marks)

Or

b) How probablity of completion for a project can be determined ? Discuss the steps involved for it ?

(10 marks)

IV. a) What do you mean by hauling and what are the different types of equipment used as hauling equipment ; describe briefly.

(10 marks)

Or

b) What are the piles and pile driving equipments available for construction. (6 marks)

What are the equipments needed for pile capping ? Name them. (4 marks)

V. a) Explain the use of documentation and quality control circles in construction quality management.

(10 marks)

Or

b) Explain :

(i) Prequalification for tenders. (5 marks)

(ii) Earnest money deposit. (5 marks)

VI. a) Explain the role of the various partners in safety management. (10 marks)

Or

b) Explain the objectives of the materials management departments. Give a typical organisation structure of materials management department.

(10 marks)

[4 × 10 = 40 marks]

C 83661 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Civil Engineering

CE/PTCE 09 703—ENVIRONMENTAL ENGINEERING—I

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. What are the impurities present in water ?
2. State the term solid waste and list out various types of solid wastes.
3. State different types of Coagulants used in water treatment.
4. Define B.O.D.
5. Enlist the different valves used in water piping system.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Explain different types of water demand.
7. Enlist different methods used for population forecast. Explain Any one in detail.
8. Explain river intake with neat sketch showing all the components.
9. What is optimum dose of coagulant ? How it is determined ?
10. What is air binding ? What are its effects ?
11. Describe the procedure of design of pumps and rising main.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (a) What are the causes for pollution of surface and subsurface sources of water ? State the measures to be adopted to prevent pollution of water.

Or

(b) Explain with a neat flowchart, the essentials of water supply engineering

13. (a) What are the different types of reservoirs used for storage purposes ? Explain any *one* system in a neat sketch.

Or

(b) What are the methods available for supplying water to the consumers ? Which one do you think to be preferable and why ?

14. (a) Discuss the relative merits of rapid sand filters and slow sand filters indicating the condition favorable for the choice each

Or

(b) What do you understand by the term water softening ? Explain with neat sketch the zeolite process for softening of water.

15. (a) Discuss in detail the concept of linking of Indian rivers. Write the various constraints in executing this project.

Or

(b) Explain the hardy cross method used for pipe network analysis in water distribution system.

(4 × 10 = 40 marks)

C 83660 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Civil Engineering

CE/PTCE 09 702—DESIGN OF HYDRAULIC STRUCTURES

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. What is arch dam ?
2. What are canal outlets ?
3. What is surplus work ?
4. Write a note on syphon well drop.
5. What is super passage ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. List the factors that affect the selection of a site for a dam.
7. Explain the evolution of final profile of a gravity dam.
8. What are the components of canal regulator and their uses ?
9. Explain with a neat sketch the plug hole arrangement working in a tower head sluice.
10. Explain the cross drainage works.
11. Explain diversion head works with functions.

(4 × 5 = 20 marks)

Part

Answer any **one** *question.*
It carries 40 *marks.*

12. Design a sluice taking off from a tank with the following data, irrigating area 200 hectares at 1000 duty. The tank bund through which the sluice is taking off has a top width of 2 m, with 2 : 1 side slopes. The top level of tank is + 40.00 m and the ground level at site is + 34.50 m. Good hard soil for foundation is available at + 33.50 m. The sill of the sluice at off take is + 34.00 m. The maximum water level in tank is + 36.00 m. The full tank level is + 37.00 m. Average low water level of the tank is + 36.00 m. The details of the channel below the sluice are as follows :

Turn over

Bed level + 34.00 m

Full supply level : + 34.50 m

Bed width 1.25 m

Side slope 1.5 to 1 with top of tank at + 35.50. (20 marks)

Draw the section across barrel and well. (20 marks)

Or

13. Design a siphon aqueduct if the following data at the crossing of a canal and a drainage are given :

(i) Discharge of canal = 40 cumecs

(ii) Bed width of canal = 30 m

(iii) Full supply depth of canal = 1.6 m

(iv) Bed level of canal = 206. 4 m

(v) Side slopes of canal = 1½ H : IV

(vi) High flood discharge of drainage = 450 cumecs

(vii) High flood level of drainage = 207.0 m

(viii) Bed level of drainage = 204.5 m

(ix) General ground level = 206.5 m

(20 marks)

Also draw to scale the following :

(a) Longitudinal section.

(b) Half plan at top and half plan at foundation.

(10 + 10 = 20 marks)

[1 × 40 = 40 marks]

C 83659 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Civil Engineering

CE/PTCE 09 701—STRUCTURAL DESIGN–III

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. What is meant by slenderness ratio of a compression member ?
2. Under what condition will the effective length be infinity and what is the meaning of this condition ?
3. List out different types of retaining wall.
4. What is prestressing ?
5. List out the important properties of structural steel.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

1. Explain the steps involved in the design of a isolated footing.
2. Explain the reduction factor method for design of slender columns. Under what conditions is the method specified to be used in IS code ?
3. Explain the effect of water in backfill on the active earth pressure on a retaining wall.
4. Explain the structural configuration of a railway bridge.
5. Explain the necessity of high strength steel concrete in prestressed concrete member.
6. Explain IRC loading on a bridge.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*

Each question carries 10 *marks.*

1. Design a square footing for a circular column of 500 mm diameter, reinforced with 8 numbers of 25 mm diameter bars and carrying a service load of 1250 kN. Assume soil with allowable pressure of 200 kN/m^2 at depth of 1.25 m below ground. Adopt M20 concrete for column, M25 concrete for footing and Fe – 415 grade steel for both column and footing.

Or

2. Design the reinforcement for a column with tex = tey = 4m and size 300 × 300 mm subjected to a factored axial load of 1000 kN with biaxial moments of 100 kN and 80 kN with respect to major and minor axis respectively. Assume M20 concrete and Fe 415 steel.

3. Design a rectangular water tank of size 6m × 4m × 3m deep resting on the ground. Use M25 concrete and Fe 415 grade steel. Assume the tank is open at the top.

Or

4. Design a RC slab bridge for the following data : clear span = 4m ; width of support = 500 mm ; Live load = IRC class A loading carriage way width = 7.5 m ; Thickness of wearing coat = 80 mm. Use M20 concrete and Fe 415 steel.

5. A pretensioned beam 230 mm × 500 mm deep is prestressed by 9 wires of 6 mm dia initially stressed to 100 N/mm^2 with their controid located at 50 mm from the soffet. Find the maximum stress in concrete immediately after transfer, allowing only for elastic shortening of concrete. If the concrete undergoes a further shortening of crop and shrinkage while three is relaxation of 4% steel stress. Estimate the initial percentage loss of stress in the wires using the following data. Fe K = 50 N/mm^2 residual shrinkage strain = 3×10^{-4}.

Or

6. A prestressed beam 400 mm × 600 mm has a simple span of 6 m and is loaded with a uniformly distributed load of 20 kN/m including its own weight. The prestressing tendon is located at 150 mm from the bottom face. The effective prestress introduced through the tendons is 1000 kN. Calculate the extreme fibre stresses in the concrete at the mid-span due to the above load effects.

7. Design a steel beam of 5 m effective span, carrying a uniformly distributed load of 20 kN/m, if the compression flange is laterally unsupported. Assume f_y = 250 MPa.

Or

8. A plate girder is subjected to a maximum factored moment of 4000 kNm and a factored shear force of 600 kN, design the section with end as well as intermediate transverse stiffeners.

(4 × 10 = 40 marks)

C 83658 (Pages : 4) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Chemical Engineering

CH/PTCH 09 704—BIOCHEMICAL ENGINEERING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Differentiate between RNA and DNA.
2. Define degree of reduction.
3. Define Damkohler number.
4. Define $Y_{x/s}$.
5. Write the applications of citric acid.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Describe the tertiary structure of proteins with neat sketch.
7. Draw and explain the structure of gram-negative bacteria cell wall.
8. A fermentation broth with viscosity 10^{-2} Pa s and density 1000 kg m^{-3} is agitated in a 2.7 m^3 baffled tank using a Rushton turbine with diameter 0.5 m and stirrer speed 1 s^{-1}. Estimate the mixing time.
9. Estimate the theoretical growth and product yield coefficients for ethanol fermentation by S. cerevisiae as described by the following overall reaction :

   $C_6H_{12}O_6 \longrightarrow 2C_2H_5OH + 2CO_2$

   Assume ATP yield as 10.5 gdw of cells /mol ATP.

10. *Pseudomonas sp.* has a mass doubling time of 2.4 h when grown on acetate. The saturation constant using this substrate is 1.3 g/l (which is unusually high), and cell yield on acetate is 0.46 g cell/g acetate. If we operate a chemostat on a feed stream containing 38 g/l acetate find the following :

    i) Cell concentration when the dilution rate is one-half of the maximum.

    ii) Substrate concentration when the dilution rate is 0.8 Dmax.

11. Explain the principle and application of reverse osmosis process.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. a) What are lipids ? Classify lipids. Give examples and function of lipids.

Or

b) Describe the steps involved in the production of new products using recombinant DNA technology.

13. a) Assume that experimental measurements for a certain organism have shown that cells can convert two-thirds (w/w) of the substrate carbon (alkane or glucose) to biomass.

    i) Calculate the stoichiometric coefficients for the following biological reactions :

    Hexadecane : $C_{16}H_{34}$ + a O_2 + b NH_3 c ($C_{4.4}H_{7.3}N_{0.86}O_{1.2}$) + d H_2O + e CO_2

    Glucose : $C_6H_{12}O_6$ + a O_2 + b NH_3 c ($C_{4.4}H_{7.3}N_{0.86}O_{1.2}$) + d H_2O + e CO_2

    ii) Calculate the yield coefficients $Y_{x/s}$ (g dw cell/g substrate), $Y_{x/O2}$ (g dw cell/g O_2) for both reactions. Comment on the difference.

Or

b) Microcarrier beads 120 μm in diameter are used to culture recombinant CHO cells for production of growth hormone. It is proposed to use a 6-cm turbine impeller to mix the culture in a 3.5-L stirred tank. Air and carbon dioxide are supplied by flow through the reactor headspace. The microcarrier suspension has a density of approximately 1010 kgm^{-3} and a viscosity Of 1.3 × 10^{-3} Pa.s. Estimate the maximum allowable stirrer speed which avoids turbulent shear damage of the cells.

14. a) The hydrolysis of urea by urease is an only partially understood reaction and shows inhibition. Data for the hydrolysis of the reaction are given below in Table 1 :

Substrate concentration :	0.2M		0.02M	
	I/v	I	I/v	I
	0.22	0	0.68	0
	0.33	0.0012	1.02	0.0012
	0.51	0.0027	1.50	0.0022
	0.76	0.0044	1.83	0.0032
	0.88	0.0061	2.04	0.0037
	1.10	0.0080	2.72	0.0044
	1.15	0.0093	3.46	0.0059

Table 1 : Hydrolysis of urea

where v = moles/l-min and I is inhibitor molar concentration.

i) Determine the Michaelis-Menten constant for this reaction.

ii) What type of inhibition reaction is this ? Substantiate the answer.

iii) Based on the answer to part (ii), what is the value of Ki ?

Or

b) A strain of mold was grown in a batch culture on glucose and the following data were obtained :

Time (h)	Cell concentration (g/l)	Glucose concentration (g/l)
0	1.25	100
9	2.45	97
16	5.1	90.4
23	10.5	76.9
30	22	48.1
34	33	20.6
36	37.5	9.38
40	41	0.63

Table 2 : Biomass and substrate concentration profile.

i) Calculate the maximum net specific growth rate.

ii) Calculate the apparent growth yield.

iii) What maximum cell concentration could one expect if 150 g of glucose were used with the same size inoculum ?

15. a) Describe the principle of affinity chromatography and gel permeation chromatography processes.

Or

b) Describe the steps involved in the conventional effluent treatment process in industries.

(4 × 10 = 40 marks)

C 83657 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Chemical Engineering

CH/PTCH 09 703—SAFETY ENGINEERING IN PROCESS PLANTS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Define any *two* parameters associated with the fire and explosion characteristics of flammable materials.
2. Explain F-N curves.
3. Define ionizing radiation hazard. List the methods to eliminate and contain such a hazard.
4. Define system safety analysis and write the types of approaches used for this.
5. Illustrate the fire tetrahedron theory.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. List and explain the hazards associated with the operation of a boiler house.
7. What is a work permit ? List the objectives, types and elements of a work permit system.
8. Give the classification of atmospheric contaminants.
9. Explain Fault Tree analysis.
10. List and explain the safe practices to be adopted in the handling of fire fighting equipment.
11. Explain thermal explosion, citing examples.

(4 × 5 = 20 marks)

Turn over

Part C

Answer any **one** *question from each module.*
Each question carries 10 *marks.*

MODULE I

12. Illustrate a flare system associated with oil and gas industries. Explain its components and safety features.

Or

13. Explain the confined space safety practices to be adopted in a process industry.

MODULE II

14. Explain plant condition monitoring for reduction of process hazards along with the types and the levels.

Or

15. Write the hazards associated with working in extreme temperatures. Comment on the rules and control measures to be adopted.

MODULE III

16. Distinguish between hazard survey, hazard assessment and analysis. Explain each.

Or

17. Explain the objective, methodology and outcomes of safety audit.

MODULE IV

18. Give the preventive and protective measures to prevent fire in chemical industry.

Or

19. Explain the emergency procedure of a petroleum refinery.

(4 × 10 = 40 marks)

C 83656 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Chemical Engineering

CH/PTCH 09 702—TRANSPORT PHENOMENA

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Define diffusion co-efficient.
2. Give the statement of boundary condition for liquid- gas interfacial plane in solving viscous problems.
3. Write the expression for momentum-flux distribution in case of flow through annulus.
4. List the equations needed to describe the non isothermal flow of a Newtonian fluid.
5. Express the relation for molar rate of production at the reaction surface for a heterogeneous reaction.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Compute the mean molecular velocity and mean free path for oxygen at 1 atm and 273.2 K. Take d = 3 A.
7. Compute the viscosity of CO_2 at 200, 300, and 800 K and 1 atm.
8. Express the relations for quantities that can be derived once the velocity distribution is known in case of flow through circular tube.
9. Obtain an expression for the mass flow rate for an ideal gas in laminar flow in a long circular tube. The flow is presumed to be isothermal. Assume that the pressure change through the tube is not very large, so that the viscosity can be regarded as constant throughout.
10. Write the boundary conditions for shell energy balance.

11. Estimate the maximum possible error in computing the absorption rate using the following equation, if the solubility of A in B is known within ± 5 % and the diffusivity of A in B is known within ± 15 % ?

$$W_A = Kc_{A0}\sqrt{D_{AB}}.$$

Assume that the geometric quantities and the velocity are known very accurately.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (a) Discuss the pressure and temperature dependence of viscosity.

Or

(b) Explain theory of thermal conductivity for gases at low density.

13. (a) Estimate the maximum diameter of micro-spherical catalyst particles that could be lost in the stack gas of fluid cracking unit under the following conditions :

Gas velocity at axis of stack	1.0 ft/s (vertically upward)
Gas viscosity	0.026 *cp*
Gas density	0.045 lb/ft^3
Density of a catalyst particle	1.2 g/cm^3

Express the result in microns.

Or

(b) A liquid of constant density and viscosity is in a cylindrical container of radius R. The container is caused to rotate about its own axis at an angular velocity Ω. The cylinder axis is vertical, so that $g_r = 0$, $g_\theta = 0$, and $g_z = -g$, in which g is the magnitude of the gravitational acceleration. Find the shape of the free surface of the liquid when steady state has been established.

14. (a) A furnace wall consists of three layers : (i) A layer of heat-resistant or refractory brick ; (ii) A layer of insulating brick ; and (iii) a steel plate, 0.25 in. thick, for mechanical protection. Calculate the thickness of each layer of brick to give minimum total wall thickness if the heat loss through the wall is to be 5000 Btu/ft^2 hr. assuming that the layers are in excellent thermal contact. The following information is available :

Material	Maximum allowable temperature	Thermal conductivity (Btu/ hr ft F)	
		at 100°F	at 2000°F
Refractory brick	2600°F	1.8	3.6
Insulating brick	2000°F	0.9	1.8
Steel	—	26.1	—

Or

(b) Explain application of energy balance to heat conduction with nuclear heat source.

15. (a) Illustrate the application of mass balance though diffusion with a homogeneous chemical reaction.

Or

(b) A catalytic tubular reactor is shown in figure 1. A dilute solution of solute A in a solvent S is in fully developed, Laminar flow in the region $z < 0$. When it encounters the catalytic wall in the region $0 < z < L$, solute A is instantaneously and irreversibly rearranged to an isomer B. Write the diffusion equation appropriate for this problem, and find the solution for short distances into the reactor. Assume that the flow is isothermal and neglect the presence of B.

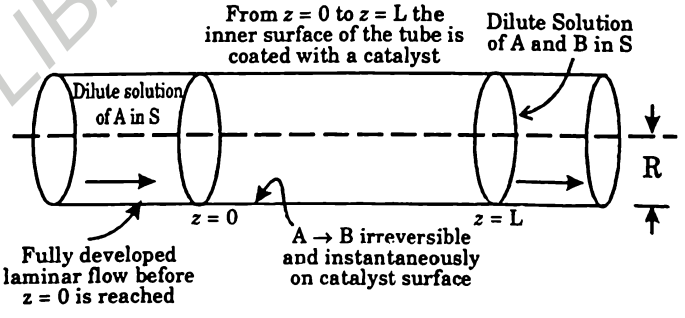


Figure 1

(4 × 10 = 40 marks)

C 83655 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Chemical Engineering

CH/PTCH 09 701—CHEMICAL ENGINEERING DESIGN AND DRAWING—I

Time : Three Hours Maximum : 70 Marks

Answer any **one** *question from each module.*
Design data book may be permitted.
Make the suitable assumptions, if required.

Module 1

1. Illustrate the I and C drawing for the packed bed distillation column with the half sectional elevation and the plan view.

(20 marks)

Or

2. Show the I and C drawing for the stirred tank agitator reactor with the half sectional elevation and the plan view.

(20 marks)

Module 2

3. Explain in detail about the determination of various stresses developed in tall columns.

(25 marks)

Or

4. A tall vertical column 2.5 m. in outer diameter and 42 m. in height is to be installed. The available specifications are: Operating temperature and pressure – 160°C and 4 kg./cm^2 (g). Design a suitable tall column for the following data with suitable assumptions :

Skirt height – 3.0 m.	Insulation thickness - 120 mm.
Tray spacing – 0.6 m.	Permissible material stress of shell – 780 kg/m^2
Top space disengagement – 1.2 m.	Welded joint efficiency – 0.80
Weir height – 60 mm.	Density of shell mtl. – 7,600 kg/m^3.
Bottom space separation – 1.8 m.	Density of insulation – 500 kg/m^3.
Tray loading with liquid – 110 kg/m^2	Over head vapor pressure line – 2280 mm.
Tray support ring – 45 mm. × 45 mm. × 11 mm. angles	Weight of ladder - 30 kg/m.
Corrosion allowance – 1.5 mm.	Weight of 280 mm outer diameter pipe - 60 kg/m.
Wind force acting over vent – 110 kg/m^2	
Design pressure – 4 × 1.2 = 4.8 kg./cm^2	

(25 marks)

Turn over

Module 3

5. 1.2 kg/sec of an organic liquid is to be cooled from 45 °C to 20 °C. The organic liquid is cooled by chilled water supplied from a refrigerator unit at a temperature of 5 °C and can be heated up to 10°C. Overall heat transfer coefficient is 590 W/m^2 K. 12 mm. inside diameter with 2 mm. thickness tubes arranged on triangular pitch of 31 mm. and 1.5 meter in length are available with 2 pass arrangement in triangular pitch (n = 2.207 and k = 0.249). Thermal conductivity of steel tube is 45 W/mk. Fouling resistance for organic liquid is 0.0002 m^{2}K/W. Fouling resistance for water is 0.0004 m^{2}K/W Determine the heat load, water flow rate, area of heat transfer, number of tubes, tube bundle diameter and heat transfer coefficients. Design a suitable 1 - 2 pass heat exchanger and draw the half sectional elevation with the side view of the designed heat exchanger.

Properties of organic liquid and water are :

	Organic liquid	*Water*
Specific heat (J/Kg K)	2150	4180
Viscosity (N-S/m2)	0.25×10^{-3}	0.8×10^{-3}
Density (Kg/m^3)	716	1,000
Thermal conductivity (W/mK)	0.133	0.61

(25 marks)

Or

6. Ammonia vapors are to be condensed at 1,500 KN/m^2. Saturation temperature of ammonia vapors is equal to 42 °C. Flow rate of vapors = 0.3 Kg/sec. Water is available at 28 °C and heated up to 33 °C. 25 mm. outside diameter with 2 mm. thickness tubes arranged on triangular pitch of 31 mm. and 5 meter in length are available. Number of passes = 4 (k = 0.158 and n = 2.263). Overall heat transfer co-efficient for condensing ammonia vapors = 1,000 W/m^2 K. Properties of liquid ammonia :

Density = 600 kg/m^3, Viscosity = 0.085×10^{-3} N.S/m^2, Thermal conductivity = 0.502 W/mK. Fouling factor on ammonia side = 0.0002 m^2 K/W. Fouling factor on water side = 0.0004 m^{2}K/W. Latent heat of ammonia vapors = 1092 kJ/kg. Thermal conductivity of water = 0.63 W/mK. Viscosity of water = 0.7×10^{-3} N.S/m^2.

Calculate the heat load, heat transfer surface area, water flow rate required, tube bundle diameter, tube side heat transfer co-efficient and heat transfer coefficient for the condensing vapour. Design a suitable horizontal type condenser and draw the half sectional elevation with the side view of the designed condenser.

(25 marks)

D 71474 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) [2014 SCHEME] DEGREE {SUPPLEMENTARY} EXAMINATION, NOVEMBER 2019

Applied and Instrumentation Engineering

AI 14 701—PROCESS CONTROL INSTRUMENTATION

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Write short notes on Self Regulating Process.
2. Define Error signal.
3. Draw the diagram of flapper nozzle assembly.
4. Enlist the characteristics and slopes with respect to trim types.
5. Explain the pneumatic compressor.
6. Categorize the valve by function and actuation.
7. Describe how direct and indirect ratio control differs.
8. Define Laplace Transform.
9. Compare simple and multiple Linear regression.
10. Describe Maximum Likelihood Estimation.

(8 × 5 = 40 marks)

Part B

Answer **one** *question from each module.*
Each question carries 15 *marks.*

11. (a) Describe how controlled and manipulated variable are represented for a Distillation column.

Or

(b) Derive and describe how interacting system works.

12. (a) Describe the air filter regulator unit with neat diagram.

Or

(b) Explain in detail the working of Hydraulic actuator.

Turn over

13. (a) Describe in detail the procedure of valve sizing.

Or

(b) Describe how cascade control can be employed in Boiler drum level control.

14. (a) Describe and Derive an expression for Non-linear Regression.

Or

(b) Describe the strategies for reducing control loop interactions.

(4 × 15 = 60 marks)

D 71455 (Pages : 6) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) [2009 SCHEME] DEGREE {SUPPLEMENTARY} EXAMINATION, NOVEMBER 2019

Production Engineering

PE 09 702—OPERATION RESEARCH—I

Time : Three Hours Maximum : 70 Marks

Use of Statistical tables is allowed.

Part A

Answer **all** *questions.*

Each question carries 2 *marks.*

1. What are the contributions of Henry L. Gantt towards the development of 'Operations Research' ?

2. A steel producing company produces an alloy having the following specifications :

   Specific gravity ≤ 0.9

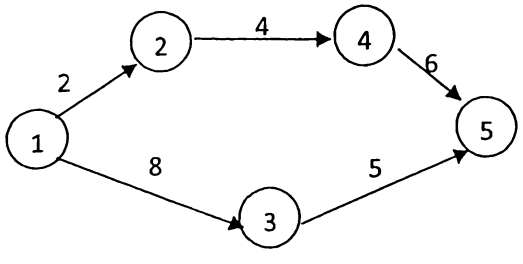
   Melting point $\geq 400°C$

   Raw materials A and B. The properties are presented in the table shown below :

Property	Properties of the raw materials	
	A	B
Specific gravity	0.8	0.95
Ultimate strength	380°C	420°C

   Cost of the raw materials A and B per ton are Rs. 8,000 and Rs. 3,000 respectively. Formulate this situation as Linear Programming model to find the proportions in which A and B be used to obtain an alloy of desired properties with the cost of raw materials is minimum.

3. Determine the critical path of the project network shown below.



Turn over

4. What is 'system length' of a queuing system ?

5. Mention any *two* characteristics of decision-making environment under uncertainty.

(5 × 2 = 10 marks)

Part B

Answer any **four** *out of six.*
Each question carries 5 *marks.*

6. Solve the following linear programming problem graphically :

Maximize $Z = 80x_1 + 120x_2$,
subject to $x_1 + x_2 \leq 9$
$20x_1 + 50x_2 \leq 360$
$x_1 \geq 2$
$x_2 \geq 3$
$x_1, x_2 \geq 0$.

7. Apply simplex method to solve the following linear programming problem :

Maximize $Z = 5x_1 + 3x_2$,
subject to $3x_1 + 5x_2 \leq 15$
$5x_1 + 2x_2 \leq 10$
$x_1, x_2 \geq 0$.

8. Find the optimal assignment for the assignment problem with the following cost matrix :

	I	II	III	IV
A	5	3	1	8
B	7	9	2	6
C	6	4	5	7
D	5	7	7	6

9. Determine the initial basic feasible solution to the following transportation problem using Vogel's approximation method.

		Destination					
		D	E	F	G	H	Supply
Origin	A	2	11	10	3	7	4
	B	1	4	7	2	1	8
	C	3	9	4	8	12	9
Demand		3	3	4	5	6	

10. Enumerate the steps followed to carry out Monte-Carlo simulation.

11. An automobile parts selling retailer has the following probabilities of selling a spark plug in a day :

Number of spark plugs sold	Probability
10	0.10
11	0.15
12	0.20
13	0.25
14	0.30

Cost of a spark plug is Rs.80 and sale price is Rs.100. The retailer cannot return the unsold spark plugs. How many spark plugs should the retailer order ?

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12 (a) Apply two phase method to solve the following Simplex problem :

Maximize $Z = 5x_1 - 4x_2 + 3x_3$,
subject to $2x_1 + x_2 - 6x_3 = 20$
$6x_1 + 5x_2 + 10x_3 \leq 76$
$8x_1 - 3x_2 + 6x_3 \leq 50$
$x_1, x_2, x_3 \geq 0$.

Or

(b) Solve the following Simplex problem :

Maximize $Z = 2x_1 + 3x_2$,
subject to $x_1 + 2x_2 \leq 8$
$3x_1 + 2x_2 \leq 15$
$x_1, x_2 \geq 0$.

If the new requirement vector is $(4, 20)^T$, find the new optimal solution.

13. (a) Determine the optimum project duration and cost for the following data :

Activity	Normal		Crash	
	Time (days)	Cost (Rs.)	Time (days)	Cost (Rs.)
1–2	8	100	6	200
1–3	4	150	2	350
2–4	2	50	1	90
2–5	10	100	5	400
3–4	5	100	1	200
4–5	3	80	1	100

Or

(b) A project is represented by the network shown below and has the following table :

Task	A	B	C	D	E	F	G	H	I
Least time	5	18	26	16	15	6	7	7	3
Greatest time	10	22	40	20	25	12	12	9	5
Most likely time	8	20	33	18	20	9	10	8	4

Determine the following :

(i) Expected time of tasks and their variance.

(ii) The earliest and the latest expected time to reach each mode.

(iii) The critical path.

(iv) The probability of completing the project within 41.5 weeks.

14. (a) Workers come to tool store room to receive special tools (required by them) for accomplishing a particular project assigned to them. The average time between two arrivals is 60 seconds and the arrivals are assumed to be in Poisson distribution. The average service time (of the tool room attendant) is 40 seconds. Determine :

(i) Average queue length.

(ii) Average length of non-empty queues.

(iii) Average number of workers in system including the worker being attended.

(iv) Mean waiting time of an arrival.

(v) Average waiting time of an arrival (worker) who waits and

(vi) The type of policy to be established. In other words, determine whether to go in for an additional tool store room attendant which will minimize the combined cost of attendant's idle time and the cost of workers waiting time. Assume the charges of a skilled worker Rs. 4 per hour and that of tool store room attendant Re.0.75 per hour.

(10 marks)

Or

(b) In an Engineering College, it was attended to improve the service facilities of the Library in terms of the waiting time of its borrowers. The library has two counters at present and borrowers arrive according to Poisson distribution with arrival rate 1 every 6 minutes and service time follows exponential distribution with a mean of 10 minutes. The library has relaxed its membership rules and a substantial increase in the number of borrowers is expected. Find the number of additional counters to be provided if the arrival rate is expected to be twice the present value and the average waiting time of the borrowers must be limited to half the present value. (10 marks)

15. (a) Solve the game given in the following table by applying the graphical method :

		B			
		y_1	y_2	y_3	y_4
A	x_1	19	6	7	5
	x_2	7	3	14	6
	x_3	12	8	18	4
	x_4	8	7	13	– 1

Or

(b) A businessman has two independent investments A and B available to him, but he lacks the capital to undertake both of them simultaneously. He can choose to take A first and then stop or if A is successfully, then take B or vice versa. The probability of success of A is 0.7, while for B it is 0.4. Both investments require an initial capital outlay of Rs. 2,000 and both return nothing if the venture is unsuccessful. Successful completion of A will return Rs. 3,000 (over cost) and successful completion of B will return Rs. 5,000 (over cost). Draw the decision tree and determine the best strategy.

[4 × 10 = 40 marks]

D 71444 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) [2009 SCHEME] DEGREE {SUPPLEMENTARY} EXAMINATION, NOVEMBER 2019

Applied Electronics and Instrumentation Engineering

AI 09 705 L06—DSP CONTROLLERS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Mention the four phases of program fetch stage in pipelining.
2. Give the assembly code format for TMS320C6x.
3. Draw the data format for single and double precision floating point number.
4. Name the different stages of software pipelining.
5. Mention the applications of PID controller.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Write short notes on circular addressing modes of TMS320C6x.
7. Explain the arithmetic instructions of TMS320C6x with an example.
8. Write short notes on software pipelining.
9. Writeshort notes on adaptive predictor and notch structure.
10. Write a C program for amplitude modulation (AM) scheme.
11. Write short notes on PLL.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (a) Explain the register files of TMS320C6x.

Or

(b) Explain in detail about DMA memory.

Turn over

13. (a) Discuss in detail about the constraints of TMS320C6x.

Or

(b) Write a C program to find the dot product, use linear assembly function.

14. (a) Find the 8-point FFT using DIF when $x(n)$ represents rectangular waveform.

Or

(b) Write a C program that implements an adaptive FIR predictor for the cancellation of a narrowband interference in the presence of a wideband signal.

15. (a) Write a C program that generates a square wave using a lookup table and illustrates the data format of the AD535 codec.

Or

(b) Discuss any *two* DSP application examples in codec.

(4 × 10 = 40 marks)

D 71439 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) [2009 SCHEME] DEGREE {SUPPLEMENTARY} EXAMINATION, NOVEMBER 2019

Printing Technology Engineering

PT 09 706 L21—PRINT PLANT LAYOUT AND FACILITY DESIGN

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Mention the importance of availability of drainage.
2. What are the essentials of plant layout ?
3. List the methods for ink mixing.
4. State the necessity of quality control for incoming materials.
5. How automatic feeding devices are helpful for elevators ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Mention the objectives of plant layout.
7. Discuss the importance of material movement.
8. List the layout specification for roll paper storage area.
9. State the reasons for standardization of materials to be purchased.
10. Differentiate belt and slat conveyors.
11. Discuss about the methods for the control of paper handling.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (a) Discuss about the factors influencing plant layout.

Or

(b) Elaborate on general guidelines for structural requirement of foundations.

Turn over

13. (a) Describe the settings to be done on a web press machine and sheet fed machine.

Or

(b) Illustrate the process of preparation of specification for bindery and finishing.

14. (a) Explain the importance of proper handling of materials.

Or

(b) Discuss on methods followed for material control.

15. (a) Elaborate on fork trucks and pallets.

Or

(b) Discuss on the conveyor system used for finished printing products.

(4 × 10 = 40 marks)

D 71438 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) [2009 SCHEME] DEGREE {SUPPLEMENTARY} EXAMINATION, NOVEMBER 2019

Printing Technology Engineering

PT 09 704—PRINTING MACHINERY AND MAINTENANCE

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Draw the cause and effect diagram for poor maintenance.
2. What are the various elements of systematic printing machinery maintenance ?
3. What are the objectives of condition based maintenance ?
4. What are the methods of lubrication ?
5. What are the advantages of DC motors over AC motors ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Write a note on maintenance management.
7. Briefly explain about contract maintenance.
8. Discuss the equipment needed for erection.
9. Explain how eccentrics are used in a printing machine ? What is to be checked in eccentrics ?
10. Write short notes on regeneration of used oils.
11. What are knife switches ? Explain.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (a) What are the duties and responsibilities of plant maintenance department ?

Or

(b) Describe the important emerging trends in printing machinery maintenance in brief.

13. (a) Explain the erection procedure for various prepress in brief.

Or

(b) Discuss about printing and finishing equipments.

14. (a) Explain about dampening and inking systems.

Or

(b) Enumerate the important characteristics and tests for lubricants in detail.

15. (a) Write short notes on magnetic starters and contractors.

Or

(b) Explain about electrical apparatus and electric wiring on the machines.

(4 × 10 = 40 marks)

D 71436 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) [2009 SCHEME] DEGREE {SUPPLEMENTARY} EXAMINATION, NOVEMBER 2019

Printing Technology Engineering

PT 09 701—PACKAGING TECHNOLOGY

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*

Each question carries 2 *marks.*

1. How product is related to its package ?
2. What is the difference between secondary package and tertiary package ? Give example.
3. What are the advantages and applications of wood as a packaging material ?
4. What are the components of aerosol ?
5. What is a blister pack ? What are its applications ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

Each question carries 5 *marks.*

6. Explain flexible packaging and the importance of paper in it.
7. Define shelf-life of a product and discuss various factors influencing it.
8. Discuss various tests done on plastic substrates used for packaging.
9. What are the properties of glass that makes it suitable packaging material ?
10. What are the advantages and applications of stretch wrapping ?
11. Write notes on legal aspects in packaging.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (a) Discuss the importance and procedure of the following tests done on a package :

(i) Salt spray test. (ii) Rolling test. (iii) Compression test. (iv) Vibration test.

Or

(b) Explain various cleaning methods used to prevent corrosion.

13. (a) Write notes on advantages, functions and applications of the following plastics :

(i) HDPE. (ii) Polyeolefins. (iii) PVC.

Or

(b) Discuss the manufacturing methods, applications and properties of aluminum foils.

14. (a) With neat diagram explain the manufacturing process of corrugated boards.

Or

(b) Explain various methods of vacuum forming.

15. (a) Discuss the features of the following closures with neat sketches and examples :

(i) Screw-threaded. (ii) Flip-top. (iii) Child-resistant (iv) Lug.

Or

(b) Write notes on types, features, advantages and applications of cans.

(4 × 10 = 40 marks)

D 71417 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) [2009 SCHEME] DEGREE {SUPPLEMENTARY} EXAMINATION, NOVEMBER 2019

Electrical and Electronics Engineering

EE 09 706 L11—PROFESSIONAL ETHICS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

I. 1 State the types of Inquiry ?

2 Point out the problem of conflicting reasons.

3 Classify the conflict of interest. Give example.

4 Define Code of conduct.

5 Define ethical values.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

II. 1 Examine in detail the various types of Moral issues.

2 Discuss in detail about Professionalism.

3 Tabulate the difference between employee rights and professional rights.

4 Write a short note Risk Benefit analysis and its importance.

5 List out the various advantages and disadvantages of MNCs.

6 Explain how to Evaluate the self-confidence.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

III. 1 Illustrate in details the various theories about right action.

Or

2 Describe about Consensus and Controversy.

3 Define the term Risk and Safety. How we an engineer assess the safety.

Or

4 Explain the concept of Confidentiality in detail.

5 Describe the significance of the concept of Computer Ethics.

Or

6 Summarize the IEEE Code of Ethics.

7 Describe moral and values and their importance.

Or

8 Examine the importance of empathy.

(4 × 10 = 40 marks)

D 71399 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) [2009 SCHEME] DEGREE {SUPPLEMENTARY} EXAMINATION, NOVEMBER 2019

Information Technology

IT 09 706 L14—E BUSINESS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Name the elements of e-Business execution frameworks.
2. Why is the CRM trend important ?
3. What are the alternatives in selecting ERP architecture ?
4. Define channel unpredictability.
5. What are the types of focused excellence ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Draw e-Business interlocking layers and explain.
7. State the goals of selling chain application framework.
8. Mention about the need for ERP.
9. Discuss about the common e-Business design.
10. What are the key roles in blueprint's sponsorship ?
11. List the management issues in e-supply chain fusion.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (A) Draw a e-Business application architecture and explain.

Or

(B) Explain the evolution of Business.

Turn over

13. (A) Elaborate on portfolio of CRM process competencies.

Or

(B) Describe the elements of selling chain infrastructure.

14. (A) Write a case study for ERP used in the real world.

Or

(B) Explain internet enabled SCM.

15. (A) Describe the basic phases of e-blueprint planning.

Or

(B) Explain about the elements of Buy-side e-Procurement solutions.

(4 × 10 = 40 marks)

D 71397 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] (SUPPLEMENTARY) EXAMINATION, NOVEMBER 2019

Information Technology

IT 09 703—INTERNET TECHNOLOGY

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. What is meant by FTP ?
2. Define a Socket.
3. Describe DHTML.
4. What do you mean by active web pages ?
5. Mention the uses of XML document.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. What is the security features provided in application layer ?
7. List the needs of dynamic web pages.
8. Compare HTML and DHTML.
9. Write short notes on JSP servers.
10. Differentiate JSP and ASP with an example.
11. Mention the various applications of DTD.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (a) Explain in detail about the various Mail Transfer protocols with neat diagram.

Or

(b) With an example write in detail about socket programming using TCP.

13. (a) Explian briefly about the working of static web pages and dynamic web pages.

Or

(b) Write short notes on comparative studies of different technologies of dynamic page creation.

14. (a) Using Javascript develop an online portal for shopping system with two customers.

Or

(b) Explain in detail about Servlet environment and roles in Java servlet.

15. (a) Explain in detail about HTML and web pages.

Or

(b) Write short notes on the Transforming XML documents with XSLT.

(4 × 10 = 40 marks)

D 53515 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) [2009 SCHEME] DEGREE EXAMINATION, NOVEMBER 2018

Biomedical Engineering

BM 09 702—FUNDAMENTALS OF BIOACOUSTICS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Define Frequency.
2. Differentiate sound reverberation.
3. What is the application of Accelerometers ?
4. What is bioacoustics ?
5. List the advantage of sound analysis of sound monitoring system.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Discuss Explain the terms "sound pressure" and "sound intensity".
7. Write notes on Northern right whales and Finback whales.
8. What is the increase in sound pressure level if the intensity is doubled ?
9. Explain in detail about the pneumatic filters.
10. Give the application of acoustic signals for taxonomic studies.
11. Determine the length of a closed-end air column that produces a fundamental frequency (1st harmonic) of 480 Hz. The speed of waves in air is known to be 340 m/s.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*

Each question carries 10 *marks.*

12. Derive the one dimensional wave equation that defines the motion of the string by considering the forces.

Or

13. Explain the basic processes that are involved in the Resonance and Standing Waves.

14. Name four principles to be observed when considering sound insulation and say whether they are effective against airborne or structure-borne sound and how to apply these principles for a consultant's office.

Or

15. Discuss in detail the concept of duct acoustics and explain the typical modes of propagation of sound in ducts.

16. Explain in detail, the theoretical and empirical treatment of problems related to the use of underwater sound in target detection and ranging.

Or

17. Discuss in general about the reciprocal electro acoustic transducers for use in both air and water media.

18. Discuss the process of sound production in different animals including anatomy and neurophysiologic processes.

Or

19. Discuss in detail about the various computations techniques for solving acoustics Problems.

(4 × 10 = 40 marks)

D 53457 (Pages : 4) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) [2009 SCHEME] DEGREE EXAMINATION, NOVEMBER 2018

Computer Science Engineering

CS 09 706 L17/IT 09 706 L25—GRAPH THEORY AND COMBINATORICS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

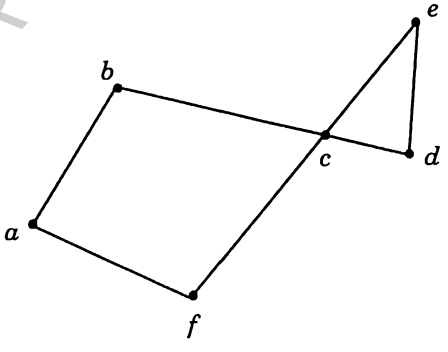
1. What is chromatic polynomial of a graph ? What is chromatic number ?
2. Find the number of regions in a 4 regular graph with 16 edges.
3. Construct a binary tree for the expression $\left(a-\left(\frac{3}{b}\right)\right)+b$.
4. How many arrangements are there of all the letters in "SOCIOLOGY" ?
5. Solve the recurrence relation $a_n - 2a_{n-1} - 3a_{n-2} = 0 \quad n \geq 2$.

(5 × 2 = 10 marks)

Part B

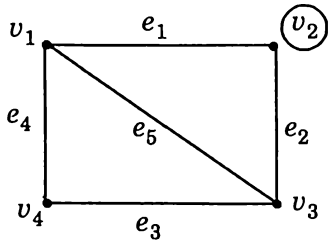
Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Explain whether the graph is Eularian and Hamiltonian. Explain, why ?



Turn over

7. Define adjacency matrix and incidence matrix of a graph find the adjacency and incidence matrix of the following graph :



8. Let T = (V, E) be a tree. Show that $v \in V$ is an articulation point of T if and only if deg $(v) > 1$.

9. For every tree T = (V, E) if $|V| \geq 2$ then prove that T has atleast two pendent vertices.

10. (a) How many different license plates are available if each plate contains a sequence of a 2 letters followed by 4 digits ?

    (b) How many ways are the to assign 3 jobs to 5 employees if each employee can be given more than one job ?

11. Solve the recurrence relation $a_n + 5a_{n-1} + 6a_{n-2} = 3n^2$.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (A) (a) Define a bipartite graph. Show that subgraph of a bipartite graph is bipartite ? Can a bipartite graph contain a cycle of odd length. Explain your answer.

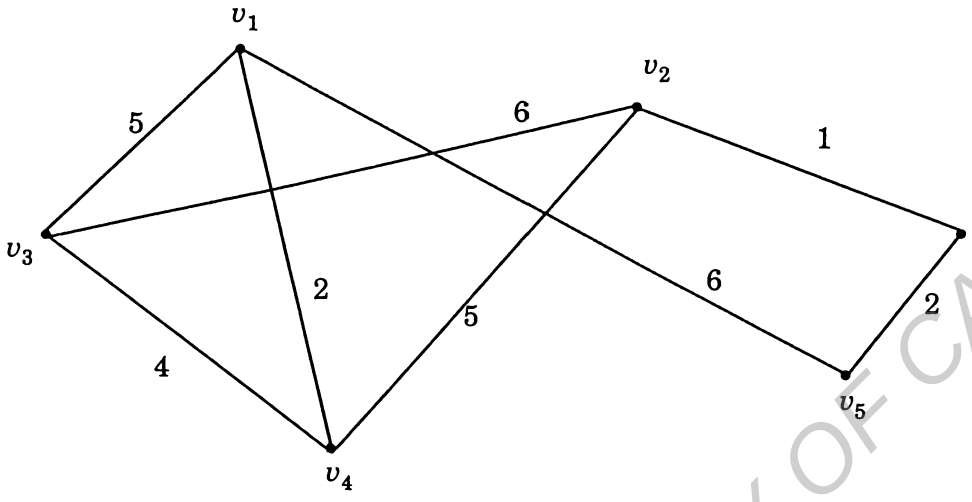
    (b) Define planar graph. Show that every loop free connected planar graph has a vertex v with deg $(v) < 6$. Show that K_5 is non-planar.

Or

(B) (a) State and prove Euler's formula.

    (b) If G = (V, E) is an undirected or multigraph then prove that $\sum_{v \in V} \deg(v) = 2|E|$ and the number of odd degree vertices is even.

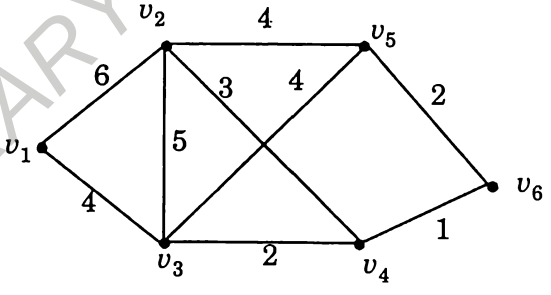
13. (A) (a) Find a minimal spanning tree of the following weighted graph using Kruskal's algorithm.



(b) What is a spanning tree ? Do every connected graph admits a spanning tree. Explain Prim's algorithm for finding the minimal spanning tree.

Or

(B) (a) Explain Dijikstra's shortest path algorithm. Determine the shortest path for the connected graph below :



(b) State maximum flow minimum cut theorem.

(c) Define a tree and give any *two* of its characteristics.

14. (A) (a) Determine the number of positive integers n, $1 \le n \le 2000$ that are not divisible by 2, 3, 5 or 7.

(b) Find the number of non-negative integer solutions of

$$x_1 + x_2 + x_3 + x_4 = 18, x_i \le 7 \text{ for } 1 \le i \le 4.$$

Or

(B) (a) Find the co-efficient of $a^3 b^4 c^3 d^5$ in the expansion of $(a - 3b + 4c + 5d + 6)^{16}$.

(b) Prove that the number of combination of n distinct objects taken r at a time with repetitions is $\binom{n+r-1}{r}$.

(c) Find the number of permutations of integers from 1 to 7 that do not have 1 in the first place, do not have 4 in the 4^{th} place and do not have 7 in the 7^{th} place.

15. (A) (a) Solve the recurrence relation $a_{r+2} - 3a_{r+1} + 2a_r = 0$ by the method of generating functions with initial conditions $a_0 = 2$ and $a_1 = 3$.

(b) Solve the recurrence relation :

$$a_r + 5a_{r-1} + 6a_{r-2} = 42(4)^r + (-2)^r.$$

Or

(B) (a) Find the generating function for the sequence :

$$1, 2, 2^2, 2^3, \ldots\ldots$$

(b) Determine the sequence generated by $\frac{1}{3-x}$.

(c) Determine the sequence generated by $(1 - 4x)^{-1/2}$.

(4 × 10 = 40 marks)

D 50136 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, NOVEMBER 2018

Electronics and Communication Engineering

EC 09 706 L12—ANTENNA THEORY AND DESIGN

Time : Three Hours Maximum : 70 Marks

Part A

I. Answer *all* questions :

1 Define antenna impedance .

2 Differentiate broad side array and end fire array.

3 List the type of paraboloid reflector.

4 Discuss advantage and disadvantage of TWA.

5 Give the normalized excitation coefficient for each array element.

(5 × 2 = 10 marks)

Part B

II. Answer any *four* questions :

6 Discuss the properties of Broad side array.

7 List the advantages of microstrip antenna.

8 Define f/d ratio, spillover and backlobe.

9 Derive design equation for corner reflectors.

10 Discuss about the need for Antenna synthesis and its method.

11 Discuss about the design procedure of Taylor series.

(4 × 5 = 20 marks)

Part C

III. Answer *all* questions :

12 (a) Derive the expression for far field of half wave dipole antenna.

Or

(b) Derive maxima, minima and half power point direction if two point sources are fed with current equal in magnitude but opposite inphase.

13 (a) Discuss in detail about N element uniform linear array.

Or

(b) Draw the radiation pattern of Endfire array of eight element with half λ uniform spacing and amplitude distribution.

14 (a) Explain conical spiral antenna.

Or

(b) Discuss the special features of parabolic reflector antenna and discuss on different types of feed with neat diagram.

15 (a) Explain in detail about Fourier series method for line source and line array.

Or

(b) Discuss about Woodward method to synthesize discrete linear array.

(4 × 10 = 40 marks)

D 50132 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) [2009 SCHEME] DEGREE EXAMINATION, NOVEMBER 2018

Electronics and Communication Engineering

EC 09 705 L18—NANO TECHNOLOGY

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*

1. Differentiate NEMS and MEMS.
2. Name the linkage groups and bonds that can be used to connect molecular building blocks.
3. What is Venn diagram ?
4. How complementary pairs and molecular building blocks were designed ?
5. What is the significance of mathematical models in NEMS systems ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

1. Illustrate the Flip-chip monolithio MEMS with actuators and sensors.
2. Find the self-inductances of a nano-solenoid with air-core and filled core (m 100 m_0). The solenoid has 100 turns (N = 100), the length is 20 nm (l = 20 nm), and the uniform circular cross-sectional area is 5 10^{18} m^2 (A 5 10^{18} m^2).
3. Show how the structural classification problem solver performed to simplify the search and optimization.
4. Explain the density functional theory.
5. Discuss the application of a monolithic IC to control the DC motor.
6. Analyze the permanent-magnet synchronous machines in the synchronous reference frames.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions*

1. Describe the applications of NEMS based on specifications and requirements.

Or

2 (i) Explain the fundamental theories in electromechanical systems. (4 marks)

(ii) Describe the fabrication of MEMS with necessary diagrams. (6 marks)

3 Discuss the density functional theory to find the wave functions, Charge density, force and displacement.

Or

4 Elucidate the molecular circuit and schematics for diode, half adder, full adder, half subtractor and full subtractor.

5 Explain the structural design of nano and MEM actuators with an example.

Or

6 Analyze the structural design of motion in nano and micro-structures.

7 (i) Show how to control NMEMS. (6 marks)

(ii) Explain the working of two-pole DC machine with commutator. (4 marks)

Or

8 Explain the two-phase symmetrical induction motor.

(4 × 10 = 40 marks)

C 84620 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Civil Engineering

CE 14 704 A—ADVANCED STRUCTURAL DESIGN—I

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Discuss about determination of design bending moment.
2. Mention the steps involved in designing of deep beams.
3. Brief about calculation of ultimate resisting moment of a slab.
4. List the assumptions for equivalent frame method of analysis of flat slab.
5. How is the load analysed when live load exceeds $\frac{3}{4}^{th}$ dead load in the design of a flat slab ?
6. Derive the expressions for weight of the lining in steel chimney and compressive stress due to the weight of the lining.
7. Discuss the factors which determine a choice between self-supporting steel chimney and guyed steel chimney is made.
8. Write short notes on complete quadratic combination method.
9. Discuss about distribution of design base shear due to lateral force.
10. Identify the ways in which earthquakes can damage structures.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. Explain about detailing of tension steel and web steel.

Or

Turn over

12. Find suitable dimension of a simply supported slab of span 6.5 to be made from structural hollow clay blocks 300 × 300 × 250 mm height with 20 m wall thickness. Determine the reinforcements required if the slab is to carry an imposed load of 4.0 kN/m^2.

13. Discuss in detail the procedure for design of flab slabs by direct design method.

Or

14. Elucidate about substitute frame method in detail.

15. Design a column of length 2.7 m for an axial load of 550 kN with lipped channel section.

Or

16. Describe about design of steel plates for self supporting steel chimneys.

17. Explain the general principles and design philosophy for design of earthquake-resistant structure along with the design criteria.

Or

18. Discuss the concepts of pseudo-velocity and pseudo-acceleration earthquake response spectra.

(4 × 15 = 60 marks)

C 84619 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2020

Civil Engineering

CE 14 703—ENVIRONMENTAL ENGINEERING—I

Time : Three Hours Maximum : 100 Marks

Part A

Answer **eight** *questions.*

Each question carries 5 *marks.*

1. Explain in brief on water supply system and developments in water treatment.
2. List the factors that affects consumption of water.
3. Explain in brief on the standards of drinking water.
4. Explain in brief on surface water sources.
5. List the points should be kept in mind while selecting a site for water intake works.
6. Explain in brief on the community water treatment.
7. What is fluoride and fluoridation ? What are its benefits ?
8. Illustrate the rural water supply schemes.
9. Explain in brief on pipe network analysis.
10. In short, illustrate the maintenance of water distribution system.

(8 × 5 = 40 marks)

Part B

Answer **all** *question.*

Each question carries 15 *marks.*

11. Explain in detail on the importance of a safe water supply system.

Or

12. Explain in detail on quantity of water.

13. Explain in detail on groundwater source protection measures.

Or

14. Explain in detail on the drinking water quality.

15. In detail, explain the treatment of water.

Or

16. In detail, explain some of the miscellaneous process of water treatment.

17. Explain in detail on water distribution system.

Or

18. Explain in detail on the principal methods to design a water distribution system.

(4 × 15 = 60 marks)

C 84618 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Civil Engineering

CE 14 702—DESIGN OF HYDRAULIC STRUCTURES

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **four** *questions.*

1. Draw elementary profile of dams and describe the salient features.
2. What are canal outlets and explain its types ?
3. Write down the Layout of a diversion head works and its components.
4. Write a note about various types of aqueducts.
5. Difference between weir and barrage.

(4 × 5 = 20 marks)

Part B

Answer any **one** *full question.*
Draw sketches wherever necessary.
The question carries 15 *marks.*

6. (a) Discuss the main functions of galleries in dams. (8 marks)

   (b) What are the causes of failure of gravity dam and how to prevent them ? (7 marks)

Or

7. Design the practical profile of a gravity dam of stone masonry, given the following data R.L. of base of dam =1450 m ; R.L. of FRL = 1480.5 Specific gravity of the masonry = 2.4 Safe compressive stress for masonry = 1200 kN/m^2 Height of waves = 1 m.

(15 marks)

Part C

Answer any **one** *full question.*
The question carries 65 *marks.*

8. Design a vertical drop horizontal floor tank surplus weir with the following data. Draw a neat sketch indicating the salient dimensions of the weir and bund section, and work out the length of the weir required with the following given data :

Combined catchment	= 26 sq. km
Intercepted catchment	= 20 sq. km
Maximum water level	= + 7.50 m
Full tank level	= + 6.70
Ground level	= + 5.80
Tank bund level	= + 1.80
Slope on either side of bund	= 2 :1
Ryve's coefficient for combined catchment	= 9.0
Ryve's coefficient intercepted	= 1.8

Or

9. Design a canal drop of 2 m with the following data.

Hydraulic particulars above the drop :

FS discharge	= 4 m^3
Bed width	= 6 m
Bed level	= + 10 m
FSL	= + 11.50 m
FSD	= 1.50 m
Half supply depth	= 1 m
Top of bank	= 2 m wide at + 12.5 m level

Hydraulic particulars below the drop :

FS discharge	= 4 m^3
Bed width	= 6 m
Bed level	= + 8.00 m
FSL	= + 9.50 m
FSD	= 1.50 m
Top of bank	= 2 m wide at +10.5 m level at the site of work is

+ 10.50 m good soil is available for foundation at + 8.50 m.

(1 × 65 = 65 marks)

C 84602 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Biomedical Engineering

BM 14 704 C—ADVANCED MEDICAL INSTRUMENTATION

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Write the principle of ECG machines.
2. Describe about TMT system.
3. Expalin the Holier monitoring.
4. Write short notes on sound stimulators.
5. Explain the principles of EEG.
6. What is cardiac output ? Explain.
7. What is spirometer ? Explain.
8. Explain the applications of NMR.
9. What are the role of various types of microscopes in medical instrumentation ? Explain.
10. What is blood gas analyser ? Explain.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. Explain with a neat sketch, the principle and working of microprocessor based ECG machines.

Or

12. Explain the advanced computer based arrhythmia detection system.
13. Discuss the measurement of average auditory stimulation.

Or

14. Explain about visually evoked potential measurement and analysis and storage.

Turn over

15. Explain the detection of physiological activities using impedance techniques.

Or

16. Describe the microprocessor based pulse oximeters.

17. Discuss the fundamentals and working of NMR spectroscopy with a neat sketch.

Or

18. Explain the working principle and instrumentation of phase contrast microscope with a neat sketch.

(4 × 15 = 60 marks)

C 84599 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2020

Biomedical Engineering

BM 14 701—DIGITAL IMAGE PROCESSING

Time : Three Hours Maximum : 100 Marks

Part A

Answer **eight** *questions.*
Each question carries 5 *marks.*

1. Define tapered quantization.
2. List the hardware oriented colour model and its applications.
3. Define resolution and pixel.
4. Explain the terms : Masking and Bit plane slicing.
5. Write a note on maximum filter and minimum filter.
6. What is the concept of algebraic approach and what are the two methods of algebraic approach ?
7. Why the restoration is called as unconstrained restoration ?
8. Give the difference between Enhancement and Restoration.
9. What are two main types of data compression ? Explain.
10. What are the coding systems in JPEG ?

(8 × 5 = 40 marks)

Part B

Answer **all** *question.*
Each question carries 15 *marks.*

11. Explain the properties of 2D Fourier transform.

Or

12. What are the different transforms used in DIP ? Explain the most advantages one in detail.

Turn over

13. Discuss the image smoothing filter with its model in the spatial domain.

Or

14. Write a detailed note on image enhancement in the frequency domain by :

    (i) Low-pass filter.

    (ii) High-pass filter.

15. What is the use of Wiener filter (or) least mean square filter in image restoration? Explain.

Or

16. Explain geometric transformation and spatial transformation in detail.

17. Define Thresholding and explain the various methods of thresholding in detail.

Or

18. Explain the segmentation techniques that are based on finding the regions only.

(4 × 15 = 60 marks)

C 84593 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2020

Applied and Instrumentation Engineering

A1 14 704 E—COMPUTER NETWORKS

Time : Three Hours Maximum : 100 Marks

Part A

I. Answer any *eight* questions out of ten.

1 Write about the OSI model (reference model).

2 Discuss about Packet Switching.

3 Write a short note on DNS-The Internet's Directory Service.

4 Discuss on transport layer Multiplexing and Demultiplexing techniques.

5 State congestion and discuss the causes of congestion.

6 Explain the basic format of multiplexed system.

7. Why is IPv4 to IPv6 transition required ?

8 Briefly write about Firewalls.

9 Explain about the point-to-point protocol frame format.

10 Write a note on ISDN and its applications.

(8 × 5 = 40 marks)

Part B

II. Answer *all* questions :

11 Explain the various types of Delays and Pocket Loss.

Or

12 Explain in detail about HTTP.

13 (a) Explain different Layers and their functionalities in TCP/IP Model. (8 marks)

(b) Explain how TCP manages a byte stream. (7 marks)

Or

Turn over

14 Describe different open and closed congestion control and also explain Leaky bucket and Token bucket algorithm briefly.

15 What is routing ? Explain the structure of a router.

Or

16 (a) List the broadcast algorithms. Explain any one of them. (8 marks)

(b) Explain briefly about the shortest path routing algorithm. (7 marks)

17 (a) Show the ARP packet format. (7 marks)

(b) Explain in detail about PPP. (8 marks)

Or

18 Analyse the various error detection techniques in transmission of data.

[4 × 15 = 60 marks]

C 84589 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Applied and Instrumentation Engineering

AI 14 703—ANALOG AND DIGITAL MOS CIRCUITS

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions out of ten.*
Each question carries 5 *marks.*

1) Discuss about the details of junction capacitance.

2) Write a short note about cascading dynamic CMOS logic.

3) Sketch and discuss the circuit of S and H circuit and capacitor integrator.

4) Difference between folded cascades with single cascade.

5) Explain the transmission gates.

6) Describe the bi CMOS logic circuit.

7) Discuss the detail about the cascading dynamic CMOS logic.

8) Draw the function Z = A.B + C.D using domino CMOS circuit.

9) Explain about metastability.

10) Describe the effects of cascading dynamic N type blocks.

(8 × 5 = 40 marks)

Part B

Answer **all** *the questions.*
Each question carries 15 *marks.*

11) Discuss the detail about single stage MOS amplifier.

Or

12) Explain the operation of MOS transistor in different operating regions with various terminal voltage.

13) Discuss about one stage cascade and 1-stage cascade and folded cascade.

Or

14) Describe about frequency compensation slew rate in 2-stage CMOS op-amp.

Turn over

15) Discuss the detail about overview of Pseudo NMOS.

Or

16) Explain the operation of bi-CMOS logic circuit and give advantage.

17) Illustrate the details about dynamic MOS logic circuit.

Or

18) Discuss about the simple logic function realization using domino logic circuits.

(4 × 15 = 60 marks)

C 84584 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Aeronautical Engineering

AN 14 701—CONTROL ENGINEERING

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

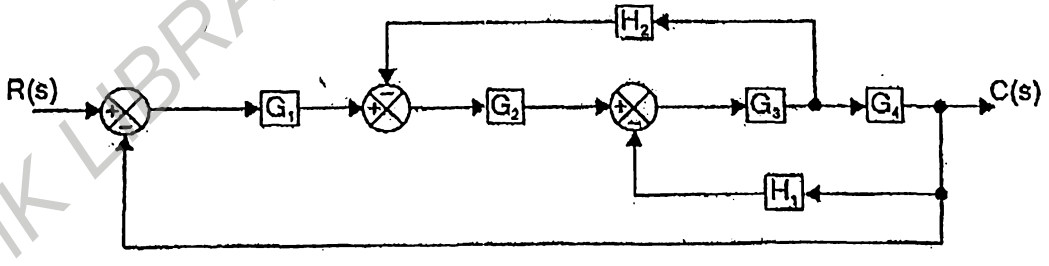
1. What are the torque-voltage and torque-current analogies of a mechanical rotational system ?
2. List out the 5 rules to obtain the transfer function of the system using signal flow graph.
3. State Mason's gain formula.
4. Define time domain specifications.
5. Find out the steady state error for a unit step and unit ramp inputs.
6. Discuss about various test signals.
7. Explain the effect of various inputs on steady state error.
8. Using Routh-Hurwitz criterion check the stability of the system whose characteristic equation is : $S^4 + 8\,S^3 + 18\,S^2 + 165 + 5 = 0$.
9. State sampling theorem and explain the sampling process.
10. What is digital PID controller ?

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

1. a) Determine the overall transfer function of the given block diagram.



(10 marks)

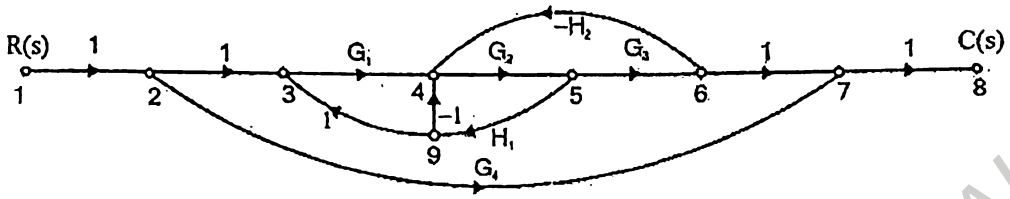
Turn over

b) Derive the transfer function of a thermal system. (5 marks)

Or

2. a) Find the transfer function of a simple pneumatic system. (5 marks)

b) Obtain the transfer function of the following signal-flow graph.



(10 marks)

3. Find the unit step response of an over damped second order system. (15 marks)

Or

4. A unity feedback system is characterized by the open loop transfer function $G(s) = \frac{10}{S(S+2)}$.

Determine the rise time, settling time, peak overshoot and peak time for a step input of 12 units.

(15 marks)

5. Sketch the bode plot and determine the gain margin and phase margin.

$$G(S) = \frac{75(1+0.2S)}{S(S^2+16S+100)}.$$

(15 marks)

Or

6. a) Explain the procedure of Routh-Hurwitz stability analysis. (5 marks)

b) Construct the Routh array and determine the stability of the system with characteristic equation $S^5 + S^4 + 2S^3 + 2S^2 + 3S + 5 = 0$.

Comment on the location of the roots.

(10 marks)

7. a) Derive the transfer function of PI,PD and PID controllers. (5 marks)

b) Consider a unity feedback system with open loop transfer function

$$G(S) = \frac{5}{S(S+0.5)(S+1)}.$$

Design a PD controller so that the phase margin of the system is 30° at a frequency of 1.2 rad/sec.

(10 marks)

Or

8. Explain the design of PID controller in frequency domain. (15 marks)

[4 × 15 = 60 marks]

C 84572 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Automobile Engineering

AM 14 703—OPERATIONS MANAGEMENT

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

I. 1 State the objectives of :

(i) Short term forecasting ; and

(ii) Long term forecasting.

2 What are the requirements of a good product design ?

3 What is meant by intermittent production and explain it types.

4 Analyze the factors influencing the plant layout.

5 Differentiate between method study and work measurement.

6 Discuss the factors to be considered for the selection of material handling equipment.

7 What is material management ? Explain its importance.

8 What are the various types of inventory ? Why they are maintained ?

9 Enumerate the specific objectives of maintenance in an organization.

10 Describe in brief the 'Economic aspects of maintenance'.

(8 × 5 = 40 marks)

Turn over

Part B

Answer **all** *questions*

Each question carries 15 *marks.*

II. 11 Describe 'Exponential smoothing method' of sales forecasting. State its advantages and limitations.

Or

12 What is meant by product life cycle ? Explain its various stages.

13 Explain the different types of layout and mention its advantages and limitations.

Or

14 Define material requirement planning and explain the inputs and outputs of a typical MRP system.

15 Write short notes on :

(i) Purchase requisition ;

(ii) Comparative statement ; and

(iii) Purchase order.

Or

16 What is Dispatching ? Explain the various activities of dispatching.

17 A small scale industrial unit consists of 6 activities as given below :

Activity	Time in days	Pre-operation
A	5	None
B	6	A
C	5	B
D	4	A
E	3	D
F	4	C, E

Draw the network diagram and calculate EST, LST, EFT, LFT and floats, mark the critical path and find total project duration.

Or

18 The following table gives the activities in a construction project and other related information :

Activity	Optimistic time (days)	Normal time (most likely time)	Pessimistic time
1–2	20	30	46
1–3	9	12	21
2–3	3	5	7
2–4	2	3	4
3–4	1	2	3
4–5	12	18	24

(i) Draw a PERT diagram ;

(ii) Calculate total project duration ; and

(iii) Mark critical path.

(5 + 5 + 5 = 15 marks)

[4 × 15 = 60 marks]

C 84571 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2020

Automobile Engineering

AM 14 701—VEHICLE ELECTRIFICATION

Time : Three Hours Maximum : 100 Marks

Part A

I. Answer any *eight* questions out of ten. Each question carries 5 marks :

1 Discuss about trickle charging of an automobile battery.

2 Discuss about the new developments in electrical storage batteries.

3 What are the differences types of starter motors ?

4 What is the significance of dwell angle in an ignition system ?

5 Why cut-out relay is essential in a charging system ?

6 What is the necessity of starters in an IC engine ? With a neat diagram explain any one starter drive mechanism.

7 Explain about different starter switches used in starting system.

8 Write a short note on different type of spark plugs used in SI engines.

9 Discuss in detail about the merits of electronic ignition system.

10 Explain in detail about centrifugal and vacuum advance mechanisms used in SI engines.

(8 × 5 = 40 marks)

Part B

II. Answer *all* questions. Each question carries 15 marks :

11 (a) With a neat sketch, explain the construction and working of a lead acid battery.

(10 marks)

(b) Discuss about the effect of temperature on specific gravity of an automobile battery.

(5 marks)

Or

Turn over

12 (a) Discuss briefly about different methods available for testing an automobile battery.

(12 marks)

(b) Enumerate the factors which affect the battery life. (3 marks)

13 (a) Discuss in detail about maintenance, servicing and trouble shooting of charging system.

(10 marks)

(b) Explain about voltage regulation in DC generator. (5 marks)

Or

14 (a) With a neat sketch, explain the construction and working of three phase alternators in automobiles.

(10 marks)

(b) With neat sketches, explain how voltage and current functions in a charging system.

(5 marks)

15 (a) With neat sketches, explain about different types of starter motor drive units.

(10 marks)

(b) Explain the different characteristics of DC series motor used in automotive starting systems.

(5 marks)

Or

16 (a) With a neat sketch, explain how does a battery ignition system works. (12 marks)

(b) Why a condenser is necessary in battery ignition system. (3 marks)

17 (a) Discuss some of the troubles faced by starter and their probable reasons also suggest suitable methods for servicing.

(12 marks)

(b) What is the necessity of ignition timing in an SI engine ? (3 marks)

Or

18 (a) With the help of a neat sketch explain the working of a CDI system. (10 marks)

(b) Discuss different types of spark plugs used in SI engines.

(5 marks)

[4 × 15 = 60 marks]

C 84570 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Mechatronics

MT 09 705 (B)—COMPUTER INTEGRATED MANUFACTURING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*

1. List the advantages of NC Machine.
2. Define ASCII
3. What are the types of AGV systems ?
4. Define ASRS.
5. What are the components of industrial robotics.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

6. Show the Procedure to Control NC Machines.
7. Explain about APT.
8. Explain about wire guided AGVs.
9. Define ASRS.
10. Explain about robot control system.
11. Explain about robot programming.

(4 × 5 = 20 marks)

Part C

Answer **all** *the questions.*

12. (a) Explain the procedure to improve accuracy and productivity of NC machines.

Or

(b) Describe the features of NC systems.

13. (a) State and explain the part programming methods.

Or

(b) Write a program for simple turning operation with detailed explanation.

Turn over

14. (a) Explain about multiclass coding system.

Or

(b) Explain in detail about bar code technology and state the advantages and disadvantages.

15. (a) Explain in detail about optimization of FMS.

Or

(b) Explain about the data types associated with FMS.

(4 × 10 = 40 marks)

C 84569 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Mechatronics

MT 09 704—ARTIFICIAL INTELLIGENCE

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. What is artificial Intelligence ?
2. Define local maxima.
3. What is Entailment ?
4. Give the building blocks of LISP.
5. What is binding in LISP ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Describe about utility based agent.
7. Write short notes on semantic networks.
8. Describe backpropogation algorithm.
9. Discuss about frames in knowledge representation.
10. Write short notes on lambda expressions.
11. How reasoning in done with horn clauses ?

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. A) Describe constraint satisfaction procedure with map coloring example.

Or

B) What are the problems encountered during hill climbing and what are the ways available to deal with these problems ?

13. A) Write the algorithm for propositional resolution and unification.

Or

B) Explain knowledge representation in networks.

14. A) Describe in detail about rule based systems with an example.

Or

B) Describe forward chaining with suitable example.

15. A) How to represent two dimensional array in LISP ? Write a program to multiply the given matrix.

Or

B Write a LISP program to find the factorial of a given number using recursive definition.

(4 × 10 = 40 marks)

C 84568 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2009 SCHEME) [SUPPLEMENTARY] EXAMINATION, APRIL 2020

Mechatronics

MT 09 703—DIGITAL SIGNAL PROCESSING

Time : Three Hours Maximum : 70 Marks

Part A

1. Classify discrete time signals.
2. Inspect the system $y(n) = ln[x(n)]$ is linear and time invariant ?
3. List the properties of Z-Transform.
4. Define Bilinear transformation with expressions.
5. Compare truncation with rounding errors.

(5 × 2 = 10 marks)

Part B

1. What is a continuous and discrete time signal ?
2. State properties of ROC.
3. Give the various steps involved in the design of MR filter.
4. What are the advantages and disadvantages of bilinear transformation ?
5. Distinguish between analog and digital filters.
6. Explain the limit cycle oscillations due to product round off and overflow errors.

(4 × 5 = 20 marks)

Part C

1. a) Explain in detail about the classification of discrete time systems.

Or

b) Define energy and power signals. Determine whether a discrete time unit step signal $x(n) = u(n)$ is an energy signal or a power signal.

Turn over

2. a) Compute the 8-point DFT of the sequence $x(n) = (0, 1, -1, 0, 0, 2, -2, 0)$ using the radix-2 decimation-in-time algorithm.

Or

b) Find the z-transform and ROC of the anticausal sequence $X(n) = \{-3, -2, -1, 0, 1\}$.

3. a) Determine H (Z) for a Butterworth filter satisfying the following specifications :

$0.8 \leq |H(e^{j\omega})| \leq 1$, for $0 \leq \omega \leq \pi/4$.

$|H(e^{j\omega})| \leq 0.2$, for $\pi/2 \leq \omega \leq \pi$.

Or

b) Use bilinear transformation method to obtain H (Z) if T = 1 sec and H (s) is :

$1/(s+1)(s+2)$

$1/(s^2 + \sqrt{2}s + 1)$.

4. a) Discuss in detail the errors resulting from rounding and truncation.

Or

b) With the help of a block diagram, explain the architecture of a TMS processor.

(4 × 10 = 40 marks)

C 84567 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2009 SCHEME) EXAMINATION, APRIL 2020

Mechatronics

MT 09 701—DESIGN OF MACHINE ELEMENTS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*

1. What are the factors to be considered for selection of material for a machine component ?
2. Which theories of failure is applicable for shafts ? Why ?
3. Why is pinion made stronger than gear ?
4. What is hypoid gear ? Why is it used in automobiles ?
5. In chain drives, the sprocket has odd number of teeth and the chain has even number of links. Why ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

6. Briefly explain about various methods to reduce stress concentration.
7. Describe about Woodruff key with a neat sketch. State its advantages and disadvantages.
8. What are the advantages and disadvantages of bushed-pin flexible coupling ?
9. Compare involute and cycloidal tooth profiles.
10. Briefly explain the thermal management carried out in the worm gear drives.
11. Two pulleys, one 450 mm diameter and the other 200 mm diameter, on parallel shafts 1.95 m apart are connected by a crossed belt. Find the length of the belt required and the angle of contact between the belt and each pulley.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *the questions.*

12. (a) The frame of a hydraulic press consisting of two identical steel plates is shown in Fig. 1. The maximum force P acting on the frame is 20 kN. The plates are made of steel 45C8 with tensile yield strength of 380 N/mm^2. The factor of safety is 2.5. Determine the plate thickness.

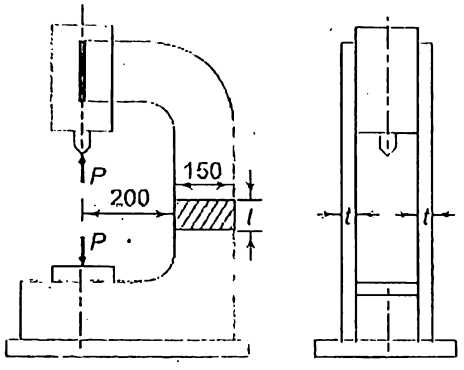


Fig.1

Or

(b) Discuss the following failure theories :

(i) Rankine's theory.

(ii) Maximum shear stress theory.

13. (a) The layout of an intermediate shaft of a gear box supporting two spur gears B and C is shown in Fig.2. The shaft is mounted on two bearings A and D. The pitch circle diameters of gears B and C are 900 and 600 mm respectively. The material of the shaft is steel FeE 580 (S_{ut} = 770 and S_{yt} = 580 N/mm^2). The factors k_b and k_t of ASME code are 1.5 and 2.0 respectively. Determine the shaft diameter using the ASME code. Assume that the gears are connected to the shaft by means of keys.

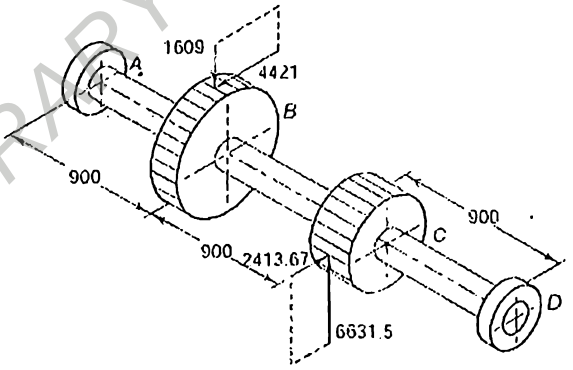


Fig. 3

All dimensions are in mm Forces are in N

Or

(b) Design a leaf spring for a truck for the following specifications :

maximum load on the truck = 160 kN, no.of springs = 4, maximum no.of leaves = 12, span of spring = 1100 mm, permissible stress = 600 N/mm^2, permissible deflection = 100 mm, no.of extra full length leaves = 2, E = 2×10^5 N/mm^2. Design for both conditions : (a) With' no initial stress ; and (b) With initial stress.

14. (a) Design a pair of helical gears to transmit 40 kW power at a speed reduction ratio of 4 : 1. The input shaft rotates at 2000 r.p.m. Take helix and pressure angles equal to 25° and 20° respectively. The number of teeth on the pinion may be taken as 28.

Or

(b) A hardened steel worm rotates at 1440 r.p.m. and transmits 12 kW to a phosphor bronze gear. The speed of the worm gear should be 60 r.p.m. Design the worm gear drive if an efficiency of atleast 82% is desired.

15. (a) A 50 kW motor running at 1000 r.p.m. is required to drive a water pump pulley at 400 r.p.m. Motor pulley diameter is limited to 0.36 m. Center distance is to be around 2.5 m. Design the V-belt drive.

Or

(b) A bucket elevator is to be driven by a geared motor and a roller chain drive with the information given below :

Motor output	=	5 kW
Speed	=	100 r.p.m.
Elevator drive shaft speed	=	45 r.p.m.
Load	=	even
Distance between centre of sprockets approximately	=	1.2 m
Period of operation	=	16 hours/day

Geared motor is mounted on an auxiliary bed for centre distance adjustments. Design the chain drive.

(4 × 10 = 40 marks)

C 84554 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Applied Electronics and Instrumentation Engineering

AI 09 704—ANALOG AND DIGITAL CIRCUIT DESIGN

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*

Each question carries 2 *marks.*

1. What is threshold voltage ?
2. Draw the MOS I/V characteristics.
3. What is the effect of slew rate limiting on an output sinusoidal waveform ?
4. How is PLA implemented in VHDL ?
5. Define assertion statement.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

Each question carries 5 *marks.*

6. Explain the operation of MOSFET as a linear amplifier.
7. Write short notes on cascade MOS current mirror circuit.
8. What are the limitations on the performance of op amp circuits at large output signals ?
9. Distinguish between variables and signals.
10. Write the trends in hardware description language.
11. Write a VHDL program for two 4-bit comparator using dataflow description.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*

Each question carries 10 *marks.*

12. Draw the MOS cascade amplifier circuit with current source biasing. With the help of small signal equivalent circuit, show that the cascading increases magnitude of open circuit voltage gain.

Or

13. Explain with circuit diagrams, class B and class AB amplifiers. Write the advantages and disadvantages.

14. Explain the different amplifier topologies describing feedback circuits.

Or

15. Explain In detail the design of a two stage op-amp.

16. With examples discuss the different types of architectural modeling.

Or

17. Discuss constant, variables and signal type of data objects with examples.

18. Design a binary multiplexer and hence write a VHDL code for a 4x4 binary multiplexe.

Or

19. Write a VHDL program for 4 bit full adder in behavioral description.

(4 × 10 = 40 marks)

C 84553 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Mechanical Engineering

ME 09 706 L25—ENERGY ENGINEERING AND MANAGEMENT

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Define the macroscopic and microscopic forms of energy.
2. List the different methods used to estimate wind speed at a location.
3. What is energy intensity ?
4. Radiation losses from the surface of a boiler practically depends upon.
5. The star rating scheme of Fluorescent Tube light as per BEE standards and labelling scheme is based on.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Is there any way of eliminating emission of gases that cause global warming while using fossil fuels ?
7. Describe the concept of 'greenhouse gas emissions trading' and discuss its implications.
8. What is energy cost is considered all part of energy audit ? Explain.
9. What do you mean by (i) Yaw control ; (ii) Rated wind speed with respect to wind turbines ?
10. Explain any five energy management opportunities in lighting systems.
11. What is meant by simple payback period ? Calculate simple payback period for a boiler that cost Rs. 75.00 lakhs to purchase and Rs. 5 lakhs per year on an average to operate and maintain and is expected to annually save Rs. 30 lakhs ?

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (a) Define the following forms of energy and explain their differences : internal energy ; thermal energy ; heat and temperature ; heat transfer ; sensible energy ; latent energy ; chemical energy ; nuclear energy ; flow energy ; flow work and enthalpy.

Or

(b) The world's oil reserves are estimated at clost to 10,000 Q. The present consumption rate is 140 Q/y. What will be the lifetime of oil reseres if the present consumption rate continues into the future and if the consumption rate increases by 1 %/y, 1.5 %/y and 2 %/y ?

13. (a) What are the different types of energy audit ? Explain the steps involved in detailed energy audit.

Or

(b) Milk is flowing in a pipe cooler at a rate of 0.95 kg./sec. Initial temperature of the milk is 55° C. and it is cooled to 18° C. using a stirred water bath with a constant temperature of 10° C. around the pipe. Specific heat of milk is 3.86 kJ/kg.°C. Calculate the heat transfer rate (kCal/hr.) and also Logarithmic Mean Temperature Difference (LMTD) of the exchanger.

14. (a) Find the minimum fluidization, minimum bubbling, terminal velocity, and velocity for the onset of transition to turbulent fluidization for 300 μm sand ($Þ_p$ = 2500 kg./m.^{3}) in a 0.203 m. × 2.03 m. bed operating under the following conditions :

Bed temperature	:	825° C.	27° C.
Gas density	:	0.316 kg./m.^{3}	1.16 kg./m.^{3}
Gas velocity	:	4.49×10^{-5} Ns/m.^{2}	1.84×10^{-5} Ns/m.^{2}

Or

(b) With an aid of heat transfer and thermodynamic concept, explain how the insulated pipe used for energy conservation.

15. (a) Illustrate the use of MIS to control the cost and resource management.

Or

(b) An ESCO company is required to invest in a waste heat recovery project, which is expected to yield an annual saving of Rs. 10,00,000 and the life of the equipment is 7 years. If the ESCO expects 30 % IRR on this project, calculate the investment required to be made.

(4 × 10 = 40 marks)

C 84552 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Mechanical Engineering

ME 09 705 L23—INDUSTRIAL SAFETY ENGINEERING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. List out any *four* disabling injuries.
2. Mention any *two* causes for industrial fires.
3. What do you meant by scrubber ?
4. Differentiate Weibull distribution and gamma distribution.
5. Define the term interlock and protection.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carriers 5 *marks.*

6. Discuss the various steps in Hazard and Operability Analysis (HAZOP) procedure.
7. Explain the various safety measures while using electricity.
8. With a suitable example explain the logics of consequence analysis.
9. Define reliability models and explain its types.
10. Suggest some ways to prevent the possible accidents in textile industry especially in the area of blow room, carding, drawing and cone winding sections.
11. Describe the concept of industrial hygiene in automobile industry.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carriers 10 *marks.*

12. (a) Discuss the different types of industrial accidents and general steps to be taken for preventing the accidents in any industry.

Or

(b) Explain in detail about safety measures in Heavy fabrication industry.

13. (a) What is fire triangle ? Explain the different classes of fire with symbols and extinguishers used for them. Draw any four symbols for possible fire hazards you have seen.

Or

(b) Explain the various types of hazards and explain any three in detail with possible causes and remedial actions.

14. (a) Identify and explain the classes and symbols of chemical hazards- with its characteristics and precautions.

Or

(b) Elaborate any *four* approaches to prevent the inhalation of hazardously contaminated air.

15. (a) Explain the terms of Functional Failures, Failure Modes, Failure effects and Failure Consequences of Reliability Centered maintenance.

Or

(b) What is a series system ? Obtain the system failure time density function for a series system with n independent components. Suppose each of the n independent components has an exponential failure time distribution with constant failure rate $\lambda_{i,} = 6, 7, 3, ..., n$. Find the system reliability.

(4 × 10 = 40 marks)

C 84551 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Mechanical Engineering

ME/PTME 09 706 L21—LOGISTICS AND SUPPLY CHAIN MANAGEMENT

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

1. What is process view of supply chain?
2. Distinguish between quantitative and qualitative forecasting method with an example.
3. What is pricing ?
4. Suggest any four inventory reduction strategies for an industry that can improve overall supply chain profit.
5. State the function of logistics system.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

6. Consider the purchase of a bottled detergent at a retail store. Describe the various stages in the supply chain and the different flows involved.
7. Mentions the benefits of effective sourcing decisions.
8. Suggested suitable step to be taken in order to reduce error in forecasting.
9. Explain the role of logistics in supply chain with an example.
10. Describe the reasons for holding inventory in an industry.
11. Describe trade-offs that must be considered when making revenue management decisions.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*

12. (a) Explain in detail about any five drivers of supply chain performance.

Or

(b) Explain in detail about how to achieve strategic fit and the scope for strategic fit.

Turn over

13. (a) Explain in detail about the role of safety inventory in a supply chain.

Or

(b) Describe time series demand forecasting methods with example.

14. (a) Describe in detail about the role of IT in supply chain.

Or

(b) Explain in detail about supplier sourcing and assessment factor.

15. (a) Describe about various factors affecting transportation decisions and various transportation modes.

Or

(b) Explain in detail about factors influencing distribution network design.

(4 × 10 = 40 marks)

C 84549 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Mechanical Engineering

ME 09 706 L14—DESIGN OF JIGS AND FIXTURES

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. How the configuration of a typical workpiece is determined ?
2. What is the best general V angle for locating circular surfaces ?
3. What are the basic rules for applying clamping forces ?
4. Name the various elements drill jig.
5. Describe the function tenon block in milling fixture.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Discuss about the 3-2-1 principles of location.
7. Discuss the various principles to be considered while designing a clamping device.
8. Sketch and describe the typical angle plate drill jig.
9. With aid of simple sketch, show the difference between template jig and plate jig.
10. Draw and indicate the various components of face milling fixture.
11. Describe the function of face plate turning fixture.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (a) Enumerate the functions of diamond pin, cylindrical, spherical and conical locators by neat sketches.

Or

(b) Discuss in detail, the construction of V block locators and nest locators by neat sketch.

13. (a) Discuss in detail the working of air to hydraulic booster circuit clamps with neat sketch.

Or

(b) Explain the working of following clamps with neat sketches :

(i) Swing clamp ; (ii) Latch clamp ; (iii) Toggle clamps ; and (iv) Two way clamp.

14. (a) With aid of simple sketch, discuss the use of channel and box type drill jig.

Or

(b) Design a drill jig for the component shown in Fig. 1. All the operations are complete except diameter 22 mm holes (2 Nos).

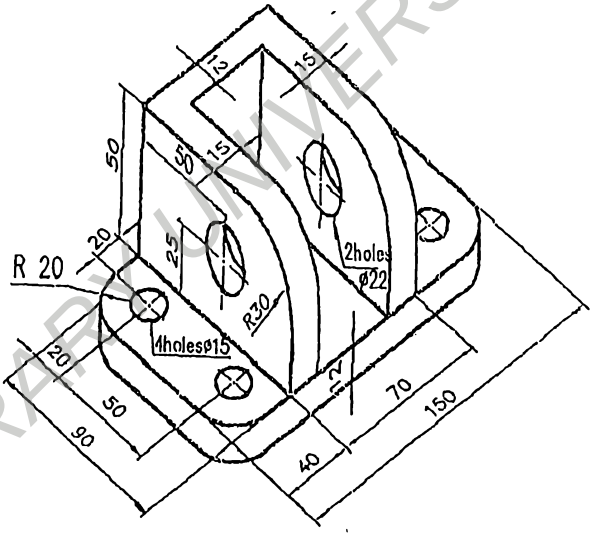


Fig. 1

15. (a) Explain the design consideration and construction of milling fixtures

Or

(b) Discuss the important features of boring fixture with simple example.

(4 × 10 = 40 marks)

C 84547 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Mechanical Engineering

ME/PTME 09 705 L07—AUTOMOBILE ENGINEERING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Write about the merits and demerits of frameless construction of vehicles.
2. State the need of modern carburetor.
3. What are the desirable characteristics of a hydraulic brake fluid.
4. What do you mean by slow steering ?
5. List down the advantages of radial ply tyres.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Differentiate two wheel drive with four wheel drive. Also describe the significance of four wheel drive with neat sketch.
7. List out the function of cylinder liners, cylinder heads, piston pin and piston rings.
8. Brief the significance of CRDI Engine.
9. Describe the variable velocity universal joints. Why this type of joint is not suggested for front axle half shaft ?
10. Describe the working principle of eddy current clutch and electronic clutch.
11. Enumerate the types of independent suspension system used in automobiles.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*

Each question carries 10 *marks.*

12. (a) Explain conventional frame construction with the help of suitable diagrams. Make a list of various components mounted on the chassis.

Or

(b) Elucidate the different valve actuating mechanisms with neat sketches.

13. (a) Describe the principle, construction and working of a MPFI engine with help of neat sketches.

Or

(b) Explain the principle, construction and working of pressure sealed cooling system with neat sketches.

14. (a) Where and why do we use multi plate clutch ? Explain the constructional features and working of multi plate dry clutch ?

Or

(b) Draw a diagram to show the layout of a hydraulically operated four-wheel brake system and explain its working principle.

15. (a) Explain the construction and working of unequal wishbone suspension system with its significance.

Or

(b) Define and also state the effects of the following steering geometry (i) Camber ; (ii) King-pin inclination ; (iii) Caster ; and (iv) Toe in and toe out.

(4 × 10 = 40 marks)

C 84546 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2009 SCHEME) [SUPPLEMENTARY] EXAMINATION, APRIL 2020

Mechanical Engineering

ME/PTME 09 704—POWER PLANT ENGINEERING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*

1. State the methods of increasing the thermal efficiency of Rankine cycle.
2. List the methods for steam turbine governing.
3. What do you mean by thermal pollution ?
4. What do you understand by the term 'boiler draught' ?
5. What is nuclear fusion? How does it differ from nuclear fission ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

6. Write a short note on binary vapour cycle.
7. Differentiate between impulse and reaction turbines.
8. Briefly describe about economizer
9. State the advantages of high pressure boilers.
10. List the guidelines for selection of boilers for steam power plants.
11. Explain briefly about load curve.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *the questions.*

12. (a) In a Rankine cycle, the steam at inlet to turbine is saturated at a pressure of 35 bar and the exhaust pressure is 0.2 bar. Determine: (i) The pump work ; (ii)The turbine work ; and (iii)The Rankine efficiency. Assume flow rate of 9.5 kg/s

Or

(b) Explain the construction and working of closed feed water heater with a neat sketch.

13. (a) In a stage of impulse reaction turbine provided with single row wheel, the mean diameter of the blades is 1 m. It runs at 3000 r.p.m. The steam issues from the nozzle at a velocity of 350 m/s and the nozzle angle is 20°. The rotor blades are equiangular. The blade friction factor is 0.86. Determine the power developed if the axial thrust on the end bearing of a rotor is 118N.

Or

(b) Discuss the various steps involved in inplant handling of coal.

14. (a) Explain with a neat sketch the construction and working of Benson boiler.

Or

(b) A boiler produces 200 kg of dry and saturated steam per hour at 10 bar and feed water is heated by an economizer to a temperature of 110°C. 225 kg of coal of a calorific value of 30100 kJ/kg are fired per hour. If 10% of coal remains unburnt, find the thermal efficiency of the boiler and boiler and grate combined.

15. (a) With a neat sketch explain the working principle of pressurized water reactor. State its merits and limitations.

Or

(b) Describe the working principle of gas cooled reactor with a neat sketch. What are its advantages and disadvantages.

(4 × 10 = 40 marks)

C 84545 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2009 SCHEME) [SUPPLEMENTARY] EXAMINATION, APRIL 2020

Mechanical Engineering

ME/PTME 09703—METROLOGY AND INSTRUMENTATION

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

1. Discuss the relationship between sensitivity and range.
2. Define : Primary and secondary transducers.
3. Describe the working principle of glass thermometer.
4. Define : Hotwire anemometers.
5. What is slip gauge ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

6. Explain the following terms with suitable examples, (i) Repeatability (ii) Dynamic response.
7. Explain the different types of bi- metallic sensors ?
8. Write about the Ionizing gauges with application
9. Concise about the active and passive transducers.
10. How the mechanical comparator is used ? State with an example.
11. Enumerate about optical instruments for angular measurement.

(4 × 5 = 20 marks)

Part C

12. (a) Give the structure of generalized measurement system and explain in detail.

Or

(b) Explain in detail various types of errors that may arise in engineering measurements and the ways to control it.

Turn over

13. (a) Explain the construction and working principle of LVDT. State its advantages, disadvantages and applications.

Or

(b) With diagram explain thermal conductivity gauge and Me Leod gauge.

14. (a) What are Peltier and Seeback effect ? How are they responsible in thermo-emf generation? Explain the different types of thermocouples.

Or

(b) Define atmospheric pressure and absolute pressure. Give units of pressure. Draw and explain the pressure measurement using diaphragm and bellows.

15. (a) Explain Johansson Microkator and Sigma Comparators with neat sketches.

Or

(b) Discuss about the various types of Limit Gauges.

(4 × 10 = 40 marks)

C 84544 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Mechanical Engineering

ME/PTME 09 702/AM 09 702—OPERATIONS MANAGEMENT

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Why forecasting is necessary ?
2. Define facility location.
3. Write the examples of purchasing policies.
4. Define critical scheduling.
5. What is crashing of CPM networks ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Define Operations Management and explain the need and scope of Operations Management in the decision making process.
7. What do understand job Design ? Enumerate the human elements in job Design.
8. Explain the concept of Product Design. What are the steps involved in Process Design ?
9. Discuss the nature of Materials Requirement Planning. What are the fundamental principles of MRP.
10. Explain about safety stock.
11. Discuss the various economic aspects in project management.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*

Each question carries 10 *marks.*

12. (a) The table below gives the sales record of a firm. Using regression analysis forecast the sales in the month of January and February next year.

Month :	Jan	Feb	Mar	April	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Sales units	90	111	99	89	87	84	104	102	95	114	103	113

Or

(b) Explain the product life cycle management. What are factors involved in it ?

13. (a) Discuss about the overview of CRP and ERP.

Or

(b) Explain:

(i) ABC analysis ;

(ii) KAIZAN ; and

(iii) 5S approach.

14. (a) The annual demand for the company is 25,000 pcbs and each costing of pc bios Rs. 1,000 and ordering cost is of Rs. 200 and inventory cost is Rs. 100. Calculate Equivalent order quantity, no of order, duration of order, total annual cost of the inventory and total cost.

Or

(b) Explain the resource leveling and resource allocation procedure in project management with examples.

15. (a) Distinguish between a job shop, a group technology cell and a flow shop.

Or

(b) Explain the trade-off in network crashing.

(4 × 10 = 40 marks)

C 84543 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2009 SCHEME) [SUPPLEMENTARY] EXAMINATION, APRIL 2020

Mechanical Engineering

ME/PTME/AM09701—MACHINE DESIGN—II

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*

1 What is the difference between the clutch and the brake ?

2 What is creep in belts ?

3 A bearing has to have a life of 1800 hours with a reliability of 99%. What is the rated life of this bearing ? Take $b = 1.17$.

4 State the two important reasons for adopting involute curve for gear tooth profile.

5 What are the principles for the design of machined components ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

6 Explain the working of internal expanding shoe brake with a neat sketch.

7 An engine running at 150 r.p.m. drives a line shaft by means of a belt. The engine pulley is 750 mm diameter and the pulley on the line shaft is 450 mm. A 900 mm diameter pulley on the line shaft drives a 150 mm diameter pulley keyed to a dynamo shaft. Fine the speed of dynamo shaft, when 1. there is no slip, and 2. there is a slip of 2% at each drive.

8 Discuss the advantages and disadvantages of hydrodynamic bearings over hydrostatic bearings.

9 Make a neat sketch of a gear and indicate the terminology used for it.

10 Describe the following bevel gears with neat sketches : (i) Miter gears ; and (ii) Hypoid gears.

11 Explain about preparation of working drawings for manufacture of parts.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *the questions.*

12. (a) A multiple disc clutch, steel on bronze, is to transmit 4.5 kW at 750 r.p.m. The inner radius of the contact is 40 mm and outer radius of the contact is 70 mm. The clutch operates in oil with an expected coefficient of 0.1. The average allowable pressure is 0.35 N/mm^2. Find : 1. The total number of steel and bronze discs; 2. the actual axial force required ; 3. the actual average pressure; and 4. the actual maximum pressure.

Or

12. (b) Design a V-belt drive for the following data :

Power = 22.5 kW

Speed ratio = 3

Driver speed = 740 rpm.

13. (a) A single-row deep-groove ball bearing is subjected to a radial force of 8 kN and a thrust force of 3 kN. The shaft rotates at 1200 rpm. The expected life l_{10h} of the bearing is 20,000 hr. The minimum acceptable diameter of the shaft is 75 mm. Select a suitable ball bearing for this application.

Or

13. (b) Following data is given for a 360° hydrodynamic bearing :

Journal diameter = 100 mm

Bearing length = 100 mm

Radial load = 50 kN

Journal speed = 1440 rpm

Radial clearance = 0.12 mm

Viscosity of lubricant = 16 cP Calculate : (i) minimum film thickness, (ii) coefficient of friction, and (iii) power lost in friction.

14 (a) Design a helical gear drive to transmit the power of 20 hp. Speed ratio 6, pinion speed 1200 rpm, helix angle is 25°. Select suitable material and design the gear.

Or

14. (b) Design a worm gear drive to transmit 22.5 kW at a worm speed of 1440 rpm. Velocity ratio is 24:1. An efficiency of atleast 85% is desired. The temperature rise should be restricted to 40°C. Determine the required cooling area. Take overall heat transfer coefficient as 10 W/m2°C.

15. (a) Discuss the design considerations of forgings with neat sketches.

Or

15. (b) With neat drawings explain the design recommendations for welded assemblies.

C 84541 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 09 706 L22—SOFT COMPUTING TECHNIQUES

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*

Each question carries 2 *marks.*

I. 1 Define Soft Computing ?

2 Explain unsupervised learning?

3 State the meaning CANFIS ?

4 List the uses of data clustering algorithm.

5 What do you mean by tournament selection ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

Each question carries 5 *marks.*

II. 1 Using the linear separability concept, obtain the response for OR function.

(Take bipolar inputs and bipolar targets).

2 List the advantages and disadvantages of ART networks.

3 Give the principle design element necessary for the d3esign of general fuzzy logic controllers.

4 With a neat flowchart explain the operation of Genetic Algorithms.

5 Describe the four structure of Fuzzy production rule system.

6 Enumerate the advantages of Genetic algorithms.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *the questions.*

Each question carries 10 *marks.*

III. 1 Explain McCulloch-Pitts Neuron in brief.

Or

2 Explain AD ALINE and MADALINE Network.

3 Explain Radial Basis Function Network (RBFN) in brief.

Or

4 Explain Feature map. Discuss Kohonen Self Organization Map (KSOM) in brief ?

5 Discuss different Defuzzification methods.

Or

6 Discuss Mamdani Model for FIS.

7 Discuss different encoding techniques used for GA.

Or

8 How Genetic Algorithm is different from traditional algorithms ? What do you understand by Fitness function in GA.

(4 × 10 = 40 marks)

C 84539 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2009 SCHEME) [SUPPLEMENTARY] EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE/PTEE 09 706 L13—HIGH VOLTAGE ENGINEERING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*

I. 1 Outline the concept of corona discharge.

2 State the factors which affect breakdown of gaseous dielectrics.

3 What is tesla coil ?

4 Write the advantages and disadvantages of CVT.

5 State the factors affecting discharge detection.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

II. 1 Explore the concept of penning effect.

2 Discuss the properties of composite dielectrics.

3 Write the different forms of high voltages required for the testing of electrical apparatus

4 Explain the components of multistage impulse generator.

5 Discuss the factors that are influencing the peak voltage measurement using sphere gap.

6 Explain the transformer ratio arm bridge for audio frequency range measurements.

(4 × 5 = 20 marks)

Part C

Answer **all** *the questions.*

III. 1 Explain the various theories that explain breakdown in pure and commercial liquid dielectrics.

Or

2 Explain the Townsend's first and second ionization processes.

Turn over

3 Describe, with a neat sketch, the working of a Van de Graaff generator. What are the factors that limit the maximum voltage obtained ?

Or

4 Explain the different methods of producing switching impulses in test laboratories.

5 Describe the construction, principle of operation of a generating voltmeter and give its application and limitations

Or

6 Explain series impedance, series capacitance and capacitance potential dividers used for measurement of high ac voltages.

7 With the help of a diagram of Schering bridge explain how capacitance and tanδ can be measured.

Or

8 Explain in detail about testing of generators.

(4 × 10 = 40 marks)

C 84538 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 09 705 L23—PROCESS CONTROL AND INSTRUMENTATION

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*

1. List any four objectives of process control.
2. What is actuator ? Give its types.
3. State the principles of controller.
4. How to select secondary controller in a cascade control scheme ?
5. Identify the input and output variables of distillation column.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

1. Explain the process involved in identification of elements
2. Explain the operation of final control element using block diagram.
3. Give brief note on Proportional control mode operation of continuous controllers.
4. Discuss the advantages of the force type pneumatic controllers.
5. State the principle of derivative control action with neat sketch.
6. Explain split range control with a simple example.

(4 × 5 = 20 marks)

Part C

Answer **all** *the questions.*

1. Explain the analog signal conditioning techniques used in process control.

Or

2. Explain the system evaluation stability measures taken in process control.

Turn over

3. Discuss with suitable example conversion of signal from analog to digital.

Or

4. Discuss in detail about the Electric actuators with neat sketch.

5. Illustrate a three mode electronic controller, Derive the expression for the output voltage.

Or

6. Illustrate the need and benefit of each component of composite PID controller.

7. Explain control of a heat exchanger, using feed forward control.

Or

8. Describe the issues involved in multivariable control.

(4 × 10 = 40 marks)

C 84537 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE/PTEE 09 705 L10—SWITCHED MODE POWER CONVERTERS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

I. 1 State the disadvantages of linear power supplies.

2 Mention the voltage control strategies of DC-DC converters.

3 What is the concept of switched mode converter ?

4 Outline the principle of Resonant converter.

5 Tell the necessity of power conditioner.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

II. 1 Obtain the boundary conditions between continuous and discontinuous conduction mode of operation for boost converter.

2 Explain the working of a half bridge converter with relevant circuit and wave forms.

3 Illustrate the effect of blanking time on voltage in PWM inverters.

4 Explain a method of voltage control within the Inverter ?

5 Discuss the operation of ZVS resonant switch converters. Draw the circuit diagrams and relevant waveforms.

6 With the help of circuit and relevant waveforms, discuss the working of fly back converter.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

III. 1 Illustrate the operation of Step down converter in continuous conduction mode and derive an expression for the ripple voltage.

Or

2 Explain the bipolar and unipolar PWM switching schemes used in full bridge d.c.-d.c. converter.

3 With the help of neat diagram and waveforms explain the three phase voltage source inverter operation.

Or

4 Explain square wave switching scheme in inverter and how to achieve the programmed harmonic elimination technique used in square wave pulse switching.

5 With the help of neat circuit diagram and relevant waveforms, discuss the operation of series loaded resonant d.c.-d.c. converter in discontinuous current conduction mode.

Or

6 Discuss the operation of ZCS resonant switch converters. Draw the circuit diagram and relevant waveforms.

7 Draw the circuit diagram and explain the operation of a full bridge push pull converter and draw the load current and load voltage waveform.

Or

8 Explain power line disturbances caused by switching power converters.

(4 × 10 = 40 marks)

C 84536 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 09 705 L08—VLSI DESIGN

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*

Each question carries 2 *marks.*

I. (1) What are the different MOS layers ?

(2) Distinguish between static and dynamic CMOS design.

(3) What is meant by standard unit of capacitance ?

(4) State the disadvantages of dynamic CMOS logic.

(5) What are the qualities of an ideal sequencing method ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

Each question carries 5 *marks.*

II. (1) Clearly explain about ION-IMPLANTATION step in IC fabrication.

(2) Explain the formal estimation of CMOS Inverter delay.

(3) Write down the equations for Ids of an *n*-channel enhancement MOSFET operating in Non-saturated region and saturated region ?

(4) What are the issues involved in driving large capacitor loads in VLSI circuit regions ?

(5) How switch logic can be implemented using Pass Transistors ? Explain.

(6) Write a short note on clocked sequential circuits.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*

Each question carries 10 *marks.*

III. (1) With neat diagram explain the steps involved in the p-well process of CMOS fabrication.

Or

(2) Explain with neat diagram Twin tub process.

(3) Derive an equation for Ids of an *n*-channel Enhancement MOSFET operating in Saturation region.

Or

(4) Explain pass transistor and transmission gate.

(5) With necessary illustrations explain the layout design rules and draw the layout diagram for four input NAND and NOR gate.

Or

(6) What is meant by sheet resistance Rs. ? Explain the concept of Rs. applied to MOS transistors.

(7) Explain the dynamic logic and domino logic with examples.

Or

(8) Explain two-phase clock generator using D flip-flops and draw the corresponding waveforms.

(4 × 10 = 40 marks)

C 84535 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 09 705 L07—DIGITAL CONTROL SYSTEMS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*

I. 1 Define sampling.

2 List the different programming techniques employed in digital controllers.

3 State the necessity of compensators.

4 What are state space representations of discrete time system ?

5 What is minimum order observer ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

II. 1 Find the Z-transform of : (i) Unit Ramp (ii) $f(t) = e^{-at} \cos \omega t$

2 Explain about the scaling and shifting operator.

3 Describe about steady state error.

4 Discuss the digital PID controllers.

5 Write the properties of state transition matrix.

6 Explain the duality between controllability and observability.

(4 × 5 = 20 marks)

Part C

Answer **all** *the questions.*

III. 1 State and prove the following Z-Transform theorem :

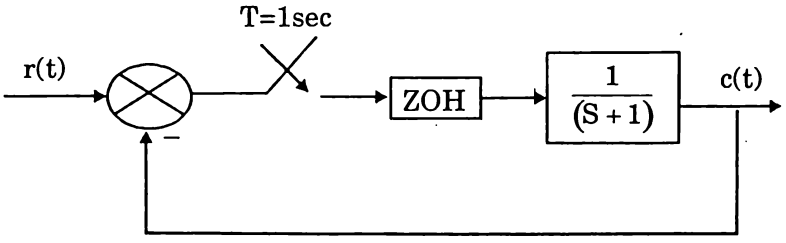
i) Initial value theorem

ii) Final value theorem

Or

Turn over

2 For the sampled data system as shown in below figure, find the response to unit step input.



3 Using Jury stability criterion find the range of K, for which the characteristic equation $Z3 + Kz2 + 1.5Kz - (K + 1) = 0$ is closed loop stable.

Or

4 Explain about the digital PID controller with neat sketch.

5 Write the state equations and the output equation of the following difference equation $c(k + 3) + 5c(k + 2) + 3c(k + 1) + 2ck(k) = u(k)$.

Or

6 Obtain the state transition matrix of the following discrete time system

$x(k + 1) = Gx(k) + Hu(k)$

$y(k) = Cx(k)$

Where $G = \begin{bmatrix} 0 & 1 \\ -3 & -3 \end{bmatrix}$, $H = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$, $C = [1 \ \ 1]$.

7 Investigate the controllability and observability of the digital system.

$$x(k+1) = \begin{bmatrix} -1 & 0 \\ 1 & -1 \end{bmatrix} x(k) + \begin{bmatrix} 1 \\ 1 \end{bmatrix} u(k) \text{ and } y(k) = [1 \ \ 1] x(k).$$

Or

8 Explain the necessary and sufficient conditions for design of state feedback controller through place placement.

(4 × 10 = 40 marks)

C 84534 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE/PTEE 09 704—ELECTRICAL MACHINE DESIGN

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*

I. 1 What is meant by separation of D and L in the design of DC machines ?

2 Explain the purpose of cooling tubes in a power transformer.

3 What are the factors influencing the performance of synchronous machine with respect to choice of specific magnetic loading ?

4 Give the advantages and disadvantages of selecting larger airgap in the design of Induction machine.

5 State the difference between squirrel cage and slip ring Induction motor.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

II. 1 Describe the effects of higher the value of specific electric loading in the design of DC machines.

2 Compare Power and distribution transformers.

3 Express the net iron area and area of copper for : i) Square core and ii) cruciform core.

4 Discuss the effects of short circuit ratio.

5 Describe the types of synchronous machines.

6 Develop an approximate equivalent circuit of an Induction motor.

(4 × 5 = 20 marks)

Part C

Answer **all** *the questions.*

III. 1 Discuss in detail about the factors affecting the choice of number of poles in the design of DC machines.

Or

Turn over

2 Determine the diameter and length of the armature core for a 55kW, 110V, 1000rpm, and 4pole dc shunt generator. Assume : Specific magnetic loading 0.5T, Specific electric loading 13000 ampere - turns, Pole arc 70% of pole pitch and length of core about 1.1 times the pole arc, Allow 10A for field current and a voltage drop of 4V for the armature circuit. Determine also the number of armature conductors and slots

3 Derive the output equation of single phase transformer and discuss the significance of window space factor.

Or

4 Determine the main dimensions of the 3 limb core (i.e., 3 phase, 3 leg core type transformer), the number of turns and cross-sectional area of the conductors of a 350 kVA, 11000/ 3300 V, star / delta, 3 phase, 50 Hz transformer. Assume: Volt / turn = 11, maximum flux density = 1.25 T. Net cross-section of core = 0.6 d2 , window space factor = 0.27, window proportion = 3:1, current density = 250 A/cm^2.

5 A water wheel generator with power output of 4750 kVA, 13.8 kV, 50 Hz, 1000 rpm, working at a pf of 0.8 has a stator bore and gross core length of 112 cm and 98 cm respectively. Determine the loading constants for this machine. Using the design constants obtained from the above machine determine the main dimensions of the water wheel generator with 6250 kVA, 13.8 kV, 50 Hz, 750 rpm operating at a power factor of 0.85.

Or

6 Describe the design of field system of an Alternator.

7 Obtain the following design information for the stator of a 30 kW, 440 V, 3Φ, 6 pole, 50 Hz delta connected, squirrel cage induction motor : (i) Main dimension of the stator, (ii) No. of turns/phase, (iii) No. of stator slots, (iv) No. of conductors per slot. Assume suitable values for the missing design data.

Or

8 Estimate the main dimensions, air-gap length, stator slots, stator turns/phase and cross-sectional area of the stator and rotor conductors for a 3-phase, 15 HP, 400V, 6-pole, 50 Hz, 975 rpm, induction motor. The motor is suitable for star delta starting. Bav = 0.45 Wb/m2, L τ = 0.85, p.f.= 0.85, efficiency = 0.9, ac = 20,000 amp.cond./metre.

(4 × 10 = 40 marks)

C 84533 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2009 SCHEME) [SUPPLEMENTARY] EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE/PTEE 09 703—DIGITAL SIGNAL PROCESSING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*

I. 1 Mention the advantages of FFT over DFTs.

2 What is meant by bit reversal ?

3 State the disadvantages of direct form realization.

4 Explain bilinear transformation.

5 Define Noise transfer function.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

II. 1 Perform the linear convolution of the sequence $x(n) = \{1, -1, 1, -1\}$ and $h(n) = \{1, 2, 3, 4\}$ using DFT method.

2 Find the circular convolution of $x(n) = \{1, 2, 3, 4\}$ with $h(n) = \{1, 1, 2, 2\}$?

3 Convert the given analog transfer function $H(s) = 1/(s + a)$ into digital by impulse Invariant method ?

4 Explain the procedure for designing analog filters using the Chebyshev approximation.

5 Obtain the cascade form realization of the digital system :

$y(n) = 3/4\, y(n-1) - (1/8)\, y(n-2) + 1/3x(n-1) + x(n)$

6 Compare the truncation and rounding errors using fixed point and floating point representation.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *the questions.*

III. 1 Compute the eight point DFT of the sequence :

$$x(n) = \left\{\frac{1}{2}, \frac{1}{2}, \frac{1}{2}, \frac{1}{2}, 0, 0, 0, 0\right\}.$$

Using radix-2 DIT algorithm.

Or

2 Explain in detail about overlap add method of convolution.

3 Obtain the direct form I, direct form II and Cascade form realization of the following system functions.

$Y(n) = 0.1\,y(n-1) + 0.2\,y(n-2) + 3x(n) + 3.6\,x(n-1) + 0.6\,x(n-2)$.

Or

4 Determine the system function H (z) of the chebyshevs low pass digital filter with the Specifications :

1. $\alpha_p = 1$ dB ripple in the pass band $0 \le \omega \le 0.2\pi$.

2. $\alpha_s = 1$ dB ripple in the stop band $0.3\pi \le \omega \le \pi$.

Using bilinear transformation (assume T = 1 sec)

5 Explain the bilinear transform method of IIR filter design. What is wrapping effect ?

Explain the poles and zeros mapping procedure clearly.

Or

6 Design an ideal high pass filter using hanning window with a frequency response :

$$H_d\left(e^{j\omega}\right) = \begin{cases} 1 \text{ for } \frac{\pi}{4} \le |\omega| \le \pi \\ 0 \text{ for } |\omega| \le \frac{\pi}{4} \end{cases}.$$

7 Determine the dead band of the system $y(n) = 0.2y(n-1) + 0.5y(n-2) + x(n)$. Assume 8 bits are used for signal representation.

Or

8 Derive the signal to quantization noise ratio of A/D converter.

(4 × 10 = 40 marks)

C 84532 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE/PTEE 09 702—ANALOG AND DIGITAL COMMUNICATION

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

I. 1 Mention the different types of transmission.

2 What is voltage time base generator ?

3 Define white noise.

4 Outline the causes for ISI.

5 State the principle of power line carrier communication.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

II. 1 Derive the relationship between total power and carrier power in AM.

2 Differentiate frequency and phase modulation.

3 Outline Ergodic processes and Gaussian processes.

4 State central limit theorem.

5 Describe the advantages and disadvantage of digital communication system.

6 Explain circuit switched network.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

III. 1 Show the phasor representation, current relation and efficiency of AM.

Or

2 What are the methods of FM generation and explain an indirect method to generate an FM signal ?

3 Generalize the equation for finding the probability density function of a one to one differential function of a given random variable.

Or

4 Write about Transmission of random process through a Linear Time Invariant (LTI) filter.

5 Distinguish various Pulse Modulation Techniques.

Or

6 What is digital modulation scheme ? Derive geometrical representation of signal.

7 Explain the types of coupling

Or

8 Describe in detail about power line modem.

(4 × 10 = 40 marks)

C 84531 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE/PTEE 09 701—POWER SYSTEM ANALYSIS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

I. 1. What is swing bus ?

2. Write the equality and inequality constraints considered in the economic dispatch problem.

3. What is meant by fault calculations ?

4. In which fault, the negative and zero sequence currents are absent ?

5. Summarize assumptions upon transient stability.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

II. 1. Prepare the advantages and disadvantages of Gauss Seidal method.

2. Write short notes on load sharing.

3. State the assumptions made in fault analysis.

4. Discuss the symmetrical components of three phase system.

5. List the assumptions made in multi machine stability studies.

6. Derive Expression for critical clearing angle.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*

Each question carries 10 *marks.*

III. 1. The parameter of a 4 bus system are as under :

Line Starting Bus	Line Ending bus	Line impedance	Line charging admittance
1	2	0.2 + j0.8	j0.02
2	3	0.3 + j0.9	j0.03
2	4	0.25 + j1.0	j0.04
3	4	0.2 + j0.8	j0.02
1	3	0.1 + j0.4	j0.01

Draw the network and find admittance matrix

Or

2. In the power system network bus 1 is slack bus with V1 = 1.0 + j0.0 per unit and bus 2 is a load bus with S2 = 280MW = j60MVAr. The line impedance on a base of 100MVA is Z = 0.02 + j0.04 per unit. Using Gauss - Seidal method, give V2.Use an initial estimate of V2 (0) = 1.0 + j0.0 and perform four iterations. Also find S1 and the real, reactive power loss in the line, assuming that the bus voltages have converged.

3. Explain the term 'Incremental Operating cost' of power system related with economic dispatch.

Or

4. The fuel inputs per hour of plants 1 and 2 are given as

$F_1 = 0.2P_1^2 + 40P_1 + 120$ Rs/hr

$F_2 = 0.25P_2^2 + 30P_2 + 150$ Rs/hr

Determine the economic operating schedule and the corresponding cost generation. The maximum and minimum loading on each unit is 100 MW and 25MW. Assume the transmission losses are ignored and the total demand is 180MW. Also determine the saving obtained if the load is equally shared by both the units.

5. With help of detailed flow chart, explain how symmetrical fault can be analysed using Zbus.

Or

6. A Double Line to Ground fault occurs on line b and c at point F in the system of figure. Point out the sub transient current in phase c of the machine 1 .assuming pre fault current to be zero. Both machine are rated 1200 KVA, 600 V with reactance of X1 = X2 = 10% and XO = 5%.each tree phase transformer is rated 1200KVA,600V delta/ 300V-star with leakage reactance of 5%.the reactance of the transmission line are X1 = X2 = 20% and X0 = 40% on the base of 1200 KVA,3300V.the reactance of the neutral of the grounding reactors are 5% on the KVA base of the machines.

7. Examine the swing equation of a synchronous machine swinging against an infinite bus. Clearly state the assumption in deducing the swing equation.

Or

8. A 150 MVA generator - transformer unit having an .overall reactance of 0.3 p.u. is delivering 150 MW to infinite bus bar over a double circuit 220 KV line having reactance per phase per circuit of 100 ohms. A 3 - phase fault occurs midway along one of the transmission lines. Give the maximum angle of swing that the generator may achieve before the fault is cleared without loss of stability.

(4 × 10 = 40 marks)

C 84530 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC/PTEC 09 706 L25—BIOMEDICAL INSTRUMENTATION

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Draw the ECG waveforms.
2. Define residual volume.
3. How can heart sounds be measured ?
4. What is cardio-converter ?
5. How is PO2 measurement done ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. List the various EEG waveforms, their frequencies and significance.
7. How can blood flow be measured using indicator dilution method ?
8. Illustrate the working of electromagnetic flow meter ?
9. Write short note on infant incubator.
10. Explain microshock.
11. How is protection against electric shock achieved from equipments ?

(4 × 5 = 20 marks)

Turn over

Part C

Answer any **one** *question from a module.*
Each question carries 10 *marks.*

12. (a) Write short note on :

    (1) Electromyogram ; and

    (2) Electroneurogram.

Or

(b) Illustrate the working of an ECG recorder with the help of a block diagram.

13. (a) Explain how lung volume and capacities can be measured using spirometer.

Or

(b) Explain any *two* plethysmography methods.

14. (a) Explain in detail about shock wave lithotripsy unit.

Or

(b) Write short notes on :

    (1) Cardiac pacemaker ; and

    (2) Defibrillators.

15. (a) Explain in detail about line isolation and ground fault interrupts.

Or

(b) Explain any *two* methods of pH measurement.

(4 × 10 = 40 marks)

C 84529 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2009 SCHEME) [SUPPLEMENTARY] EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC/PTEC 09 705 L15—TELEVISION AND RADAR ENGINEERING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

1. Mention any two advantages of interlaced scanning.
2. What is back porch ?
3. Define photoconduction.
4. What are the major parts of radar ?
5. Define MTI improvement factor.

(5 × 2 = 10 marks)

Part B

Answer **four** *questions.*

6. Why is it necessary to modulate the picture and sound signal before transmission ?
7. Sketch frequency distribution of the channel and mark location of picture carrier and sound carrier frequencies.
8. List the advantages of plasma screen.
9. Bring out the purpose of auto degaussing circuit.
10. Write notes on radar frequencies.
11. Write the notes on delay line canceller.

(4 × 5 = 20 marks)

Part C

12. a) Explain how the VSB reception of TV signal is compensated for its frequency response.

Or

b) Explain functions of equalizing Pulses, front porch & back porch of horizontal sync pulses.

Turn over

13. a) Draw the block diagram of color picture tube and explain its working.

Or

b) Draw a simple block diagram of the NTSC decoder and explain how R, G and B video signal are recovered on demodulation.

14. a) Draw the block diagram of a simple pulse radar and explain.

Or

b) Explain in detail about system losses and propagation effects.

15. a) Describe the principle of operation of pulse Doppler radar using a block diagram.

Or

b) Draw a block diagram of intermediate frequency radar and explain its operation.

(4 × 10 = 40 marks)

C 84528 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC 09 705 L14—INTERNET TECHNOLOGY

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*

1. What is a computer network ?
2. Define video streaming.
3. Write the significance of e-mail security.
4. What is the use of mobile internet ?
5. What do you mean by a transaction ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

6. Enumerate the principles of Application Layer Protocols.
7. Discuss about video-internet telephony.
8. Define 'firewall'. Mention its significance.
9. Discuss in brief about trusted systems.
10. Explain briefly about the implications of TCP over mobility.
11. Explain in detail about the need for selective retransmission.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*

12. (a) Explain in detail about socket programming with TCP and UPD.

Or

(b) Discuss about the process of webpage design using HTML.

Turn over

13. (a) Describe the applications of Multimedia Networking.

Or

(b) Elaborate on the scheduling and policing mechanisms in RTP.

14. (a) Discuss about the architecture and working of S/MIME protocol.

Or

(b) Discuss in about transport layer security.

15. (a) Explain in detail about the working of Dynamic Host Configuration Protocol.

Or

(b) Discuss in detail about the architecture and working of WAP protocols.

(4 × 10 = 40 marks)

C 84527 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2009 SCHEME) [SUPPLEMENTARY] EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC/PTEC 09 704—DIGITAL SYSTEM DESIGN

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

Each question carries 2 *marks.*

1. State the differences between synchronous and asynchronous sequential circuits.
2. What are the features of VHDL ?
3. What are races ?
4. Draw the general circuit of PAL.
5. Define clock skew.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

Each question carries 5 *marks.*

6. Differentiate between Mealy and Moore machine with suitable examples.
7. With suitable examples explain various data objects in VHDL.
8. Write a VHDL code for 4 : 1 multiplexer.
9. What is meant by sequential PLD ? Explain with a diagram.
10. Describe Logic diagram of GAL 22V10.
11. Explain metastability behaviour of flip flops.

(4 × 5 = 20 marks)

Turn over

Part C

Answer any **one** *question from a module.*

Each question carries 10 *marks.*

12. (a) Explain in detail the State diagram of a 16-bit counter.

Or

(b) Describe the state reduction techniques in a sequential circuit with an example.

13. (a) Explain VHDL procedures. How a procedure is declared ? Use suitable examples.

Or

(b) Write a VHDL code to realize a decade counter using structural modelling.

14. (a) Explain the PROM architecture which makes it possible for PLD.

Or

(b) Describe the FPGA architecture.

15. (a) Explain in detail about static and dynamic hazards.

OR

(b) What is meant by metastability ? Explain 1-FF, 2-FF and 3-FF synchronizer with necessary diagrams.

(4 × 10 = 40 marks)

C 84526 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC/PTEC 09 703—ANALOG AND MIXED MOS CIRCUITS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. What is a current source ?
2. Draw the figure of a single ended current amplifier.
3. List any 2 advantages of switch capacitor circuits.
4. List any 4 characteristics of an ideal op-amp.
5. Why preamplification is required in comparator design ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Derive expression of R_{out} of cascode current mirror.
7. With figure, explain a Gilbert cell.
8. Draw the schematic of an active load current mirror.
9. Explain the block diagram of a single stage op-amp.
10. Describe steps to design CMOS comparator.
11. How does clock comparator work ?

(4 × 5 = 20 marks)

Part C

Answer any **one** *question from a module.*
Each question carries 10 *marks.*

12. (a) Calculate the small signal output resistance of current sink. What are the limitations of current sink and how can it be overcome ?

Or

(b) Explain large signal model of n-channel MOSFET.

Turn over

13. (a) Derive the frequency response of a differential amplifier.

Or

(b) Analyse the performance of the various active load inverters.

14. (a) With necessary equations, explain the design procedure of two- stage CMOS op-amp with necessary equations.

Or

(b) Draw and explain a folded cascode amplifier with its frequency response.

15. (a) Describe in detail VCO and loop filter in PLL.

Or

(b) Write short notes on : (i) phase detector in PLL (ii) sample and hold circuit.

(4 × 10 = 40 marks)

C 84525 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2009 SCHEME) [SUPPLEMENTARY] EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC/PTEC 09 702—MICROWAVE ENGINEERING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

1. Give the S matrix of uniform transmission line.
2. What is the principle of microwave phase shifter ?
3. State the condition for oscillation in Reflex Klystron.
4. What are the applications of Backward diode ?
5. List the different types of impedance measurement methods.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions out of six.*

6. Explain the principle of T-junction direction coupler.
7. State the characteristics of 2-cavity klystron amplifier.
8. State the applications of magnetrons. Why magnetron is called as cross filed device ?
9. List out the factors which affects the efficiency of IMPATT diode. Explain.
10. What is the main purpose of slotted section with line carriage ? Draw necessary diagrams.
11. Explain Mono Lithic MIC technology.

(4 × 5 = 20 marks)

Part C

Answer **one** *question from each module.*

12. Explain in detail about Isolator and Faraday rotation of Isolator.

Or

13. Explain the concept of circulator and derive the S-matrices for three port and four port circulator.

14. With neat circuit diagrams and relevant equations, explain the velocity modulation process and bunching in a klystron amplifier.

Or

15. With neat diagrams and relevant equations, explain about helix traveling wave tube.

16. Explain in detail about tunnel diode amplifier.

Or

17. Explain in detail about microwave bipolar transistor.

18. How would you use the modern technique to measure the power at microwave frequencies ?

Or

19. i) How do you measure microwave frequency ? (5 marks)

ii) List the different types of Impedance measurement methods.

(5 marks)

[4 × 10 = 40 marks]

C 84524 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC/PTEC 09 701—INFORMATION THEORY AND CODING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. State Shannon's Channel Coding Theorem.
2. Define Mutual Information.
3. List the properties of an abelian group.
4. Prove that $GH^T = 0$ in the context of Block code.
5. Define Constraint length of a convolutional encoder.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

1. Justify the reason for choosing logarithmic function for defining information.
2. A book contains 400 pages with 450 words per page. Each word contains on an average 6 symbols chosen at random from an alphabet of size 37. Estimate the storage space in bits needed to store the information contained in the book on a compact disk. Assume there is no statistical correlation between the symbols and that all symbols occur with equal probability.
3. A linear block code has a generator matrix :

$$G = \begin{bmatrix} 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 0 \end{bmatrix}.$$

(a) Find its H matrix ; and

(b) What is the minimum distance of the code and what is its error correcting capability ?

Turn over

4. Prove the properties of Syndrome for cyclic code.

5. Distinguish between Integral domain and Division ring.

6. A $(3, 1, 2)$ convolutional code is described by $g^1 = [110]$, $g^2 = [101]$, $g^3 = [111]$. Find the generator matrix and output code vector for message sequence, $m = [11101]$.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

1. A discrete memoryless source has five symbols A, B, C, D, E with probabilities 0.4, 0.19, 0.16, 0.15 and 0.15 respectively :

   (a) Construct Shano-Fano code for the source and calculate efficiency.

   (b) Construct Huffman code and compare the two techniques of source coding.

Or

For the Joint Probability Matrix (JPM) shown below, find $H(X, Y)$, $H(X)$, $H(Y)$ and $H(X/Y)$.

$$P(X, Y) = \begin{bmatrix} 0.2 & 0 & 0.2 & 0 \\ 0.1 & 0.01 & 0.01 & 0.01 \\ 0 & 0.02 & 0.02 & 0 \\ 0.04 & 0.04 & 0.01 & 0.06 \\ 0 & 0.06 & 0.02 & 0.2 \end{bmatrix}.$$

2. (a) List the properties of a Field and give an example.

   (b) Write a short note on BCH code.

Or

   (a) List the properties of Ring and give an example.

   (b) Write a short note on Reed Solomon Code.

3. The parity check matrix for (7, 4) linear block code is given by :

$$H = \begin{bmatrix} 1 & 1 & 1 & 0 & 1 & 0 & 0 \\ 1 & 1 & 0 & 1 & 0 & 1 & 1 \\ 1 & 0 & 1 & 1 & 0 & 0 & 1 \end{bmatrix}.$$

(a) Find the generator matrix, G ;

(b) List all code words ; and

(c) How errors can be corrected.

Or

(i) The generator polynomial for $(7, 4)$ cyclic code is $X^3 + X + 1$. Find the code word for the following message sequence (a) 1010 ; (b) 1111 ; (c) 0001 ; and (d) 1000.

(ii) Find the data sequence corresponding to the received vector 1101101

4. A $(3, 1, 2)$ convolutional code is described by $g^1 = [101]$, $g^2 = [110]$, $g^3 = [111]$.

(a) Draw the encoder ;

(b) For the message sequence, m= 10011 find the encoded sequence using code tree.

(c) Verify the output sequence using transform domain approach.

Or

A $(3, 1, 2)$ convolutional code is described by $g^1 = [100]$, $g^2 = [111]$, $g^3 = [101]$.

(a) Draw the encoder ;

(b) Draw the state diagram ; and

(c) Using Viterbi algorithm, decode the received sequence,

r = 101 110 101 010 101 110 011.

(4 × 10 = 40 marks)

C 84522 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2009 SCHEME) [SUPPLEMENTARY] EXAMINATION, APRIL 2020

Information Technology

IT 09 702—NATURAL LANGUAGE PROCESSING AND KNOWLEDGE BASED SYSTEMS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

1. Differentiate homonymy and polysemy.
2. Given the sentence

   Radha owns a parrot that is larger than a cat

   Give a first order logic (FoL) formula that expresses the formal predicates Parrot (.), Owns(., .), Cat(.), Larger(.,.).
3. What is propositional logic ?
4. What is semantic net ?
5. Why incomplete reasoning ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

6. What is the need for NLP systems ? Give the techniques used in NLP.
7. Explain bottom-up parsing.
8. An augmented context-free grammar for generating the strictly indexed language $L_n, = \{a^n b^n c^n : n > 0\}$. The generator G1 is given as follows : S ® ABC, where

   A.COUNT : = S.COUNT, B.COUNT : = S.COUNT, C.COUNT : = S.COUNT

   $A_0 \rightarrow aA_1$, where A_1.COUNT : = A_0.COUNT – 1
   $B_0 \rightarrow bA_1$, where B_1.COUNT : = B_0.COUNT – 1
   $C_0 \rightarrow aC_1$, where C_1.COUNT : = C_0.COUNT – 1
   $A \rightarrow \varepsilon$, where A.COUNT = 0
   $B \rightarrow \varepsilon$, where B.COUNT = 0
   $C \rightarrow \varepsilon$, where C.COUNT = 0

   where count is the integer feature for each of the non-terminal symbols in G1.

Turn over

9. Describe the conflict resolution strategies.

10. Given : Rule base contains following Rule set :

Rule 1 : If A and C Then F

Rule 2 : If A and E Then G

Rule 3 : If B Then E

Rule 4 : If G Then D

Problem : Prove If A and B true Then D is true.

11. Elucidate on the basic components of a planning system.

(4 × 5 = 20 marks)

Part C

12. (a) Explain with a neat diagram, the steps in natural language processing.

Or

(b) Explain the different types of natural language processing.

13. (a) Draw and explain shift reduce parsing in natural language processing.

Or

(b) Explain in detail about predictive parser.

14. (a) Elucidate on scripts in knowledge representation.

Or

(b) Describe the different levels of knowledge representation.

15. (a) Describe the various planning techniques.

Or

(b) Discuss the major activities in blackboard models.

(4 × 10 = 40 marks)

C 84521 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2009 SCHEME) {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Information Technology

IT 09 701—COMPUTER GRAPHICS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Express the relationship between polar and Cartesian co-ordinates.
2. Mention the difference between window and viewport.
3. What is a Spline ? Where it is used ?
4. Give the range of r and w_1 for hyperbola and parabola conic sections.
5. Highlight the key difference between orthographic and oblique parallel projection?

(5 × 2 = 10 marks)

Part -B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Given a square object with coordinate points A (0, 3), B (3, 3), C (3, 0), D (0, 0). Apply the scaling parameter 2 towards X axis and 3 towards Y axis and obtain the new coordinates of the object.
7. Explain Mid-point subdivision algorithm for line clipping.
8. Elucidate the features of seed fill algorithm.
9. List the characteristics of Beizer curves.
10. Elaborate the steps of depth-buffer algorithm.
11. Give the representation of transformation matrices for 3D rotation about x, y and z axes.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (a) Illustrate different types of reflection with its transformation matrices.

Or

(b) Write briefly about the following :

(i) Plasma panel displays. (2 marks)

(ii) LCD displays. (2 marks)

(iii) Plotters. (2 marks)

(iv) Touch Panels. (2 marks)

(v) Light Pens. (2 marks)

13. (a) Describe Scan Line Polygon Fill algorithm with diagram.

Or

(b) Explain Sutherland Cohen algorithm for line clipping.

14. (a) Explicate the phenomena of Beta Splines and Rational Splines in detail.

Or

(b) Explain the procedure of Bresenham's circle drawing algorithm with diagram.

15. (a) Discuss the representation of 3D translation and the transformation sequence of 3D scaling with respect to fixed position.

Or

(b) Outline the parametric equations of perspective projection and describe the classification of perspective projections on the basis of vanishing points.

[4 × 10 = 40 marks]

C 84520 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2009 SCHEME) [SUPPLEMENTARY] EXAMINATION, APRIL 2020

Computer Science Engineering

CS 09 706 L24—COMPUTER BASED NUMERICAL METHODS

Time : Three Hours Maximum : 70 Marks

Part A

I. a) Find the positive root of $x^2 + 5x - 3 = 0$ using fixed point iteration starting with 0.6 as first approximation.

b) Derive Newton's Backward difference formula.

c) Form the divided difference table for :

x :	-1	1	2	4
y	-1	5	23	119

d) Evaluate $1/(1 + x^4)$ dx using Gaussian quadrature with 2 points.

e) Write the Adam's Predictor-Corrector formulae.

(5 × 2 = 10 marks)

Part B

II. a) Solve the equation $x \tan x = -1$ by Regula Falsi method starting with $a = 2.5$ and $b = 3$ correct to 3 decimal places.

b) Find the positive root of $x^4 - x = 10$ correct to three decimal places using Newton Raphson method.

c) Find the iterative formula for finding the value of 1 N where N is a real number, using Newton-Raphson method. Hence evaluate 1 /26 correct to 4 decimal places.

d) Find the root of $x = 2 \sin x$, near 1.9 correct to three decimal places by applying N.R method twice.

e) Find a real root of the equation $\cos x = 3x - 1$ correct to 5 decimal places by fixed point iteration method.

f) Solve the equations by Gauss elimination method

$2x + y + 4z = 12$; $8x - 3y + 2z = 20$; $4x + 11y - z = 33$.

(4 × 5 = 20 marks)

Part C

III. a) Write a polynomial in x which passes through the (x, y)-point (5.1, 7.2) and is zero at the x-values 3.8, 6.1, 8.9, and 10.5.

Or

b) Use Newton's method to find all three roots of the function $f(x) = x^3 + 2x^2 - 3x - 1$. You may take an error tolerance of 1×10^{-4}.

IV. a) Find all the roots of the polynomial $f(x) = P_4(x) = x^4 + 5x^3 + 7x^2 + 1$.

Or

b) Find to 4 decimals by Newton's Method, a root of $x^{\sin 2} - 4$.

V. a) Using Lagrange's interpolation formula find $f(4)$ given that $f(0) = 2$, $f(1) = 3$, $f(2) = 12$, $f(15) = 3587$.

Or

b) If $f(0) = 0$, $f(1) = 0$, $f(2) = -12$, $f(4) = (0)$, $f(5) = 600$ and $f(7) = 7308$, find a polynomial that satisfies this data using Newton's divided difference interpolation formula. Hence find $f(6)$.

VI. a) Find the Taylor series solution with three terms for the initial value problem :

$Y' = x^3 + y$, $y(1) = 1$. Find y at $x = 1.1$.

Or

b) Using Euler's modified method find $y(0.1)$ from $y' = x + y + xy$, $y(0) = 1$,with $h = 0.05$.

(4 × 10 = 40 marks)

C 84518 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) [2009 SCHEME] SUPPLEMENTARY DEGREE EXAMINATION, APRIL 2020

Computer Science Engineering

CS 09 706 L17/IT 09 706 L25—GRAPH THEORY AND COMBINATORICS

Time : Three Hours Maximum : 70 Marks

Section A

Answer **all** *questions.*
Each question carries 2 marks.

I. (a) Prove that for $n \geq 2$, the hypercube Q_n has a Hamilton cycle.

(b) Write down the prefix notation for $t+(u*v)/(w+x-y \uparrow z)$. Evaluate the prefix expression by assuming the following values :

$t = 4, u = 2, v = 3, w = 1, x = 9, y = 2, z = 3.$

(c) How many arrangements of the letters in MISSISSIPPI have no consecutive S'S ?

(d) How many positive integers n less than 6000 satisfy gcd $(n, 6000) = 1$?

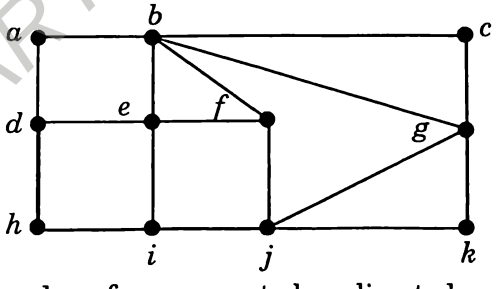
(e) Find the coefficient of x^{50} in $\left(x^7 + x^8 + x^9 + \ldots\right)^6$.

(5 × 2 = 10 marks)

Section B

Answer any **four** *questions.*
Each question carries 5 marks.

II. (a) Find the Euler circuit for the following graph. If the edge $\{d, e\}$ is removed from this graph, find an Euler trial for the resulting subgraph :



(b) Let G = (V, E) be a loop-free connected undirected graph with $|V| \geq 3$. If G has no articulation points, prove that G has no pendant vertices.

(c) Let T = (V, E) be a complete m-ary tree of height h. This tree is called a full m-ary tree if all of its leaves are at level h. If T is a full m-ary tree with height 7 and 279,936 leaves, how many internal vertices are there in T ?

Turn over

(d) Write a computer program that lists all selections of size 2 from the objects 1, 2, 3, 4, 5, 6.

(e) In how many ways can Mrs. Ford distribute ten distinct books to her ten children and then collect and redistribute the books so that each child has the opportunity to peruse two different books ?

(f) Determine the sequence generated by each of the following generating functions :

(i) $f(x) = (2x - 3)^3$.

(ii) $f(x) = x^3 / \left(1 - x^2\right)$.

(4 × 5 = 20 marks)

Section C

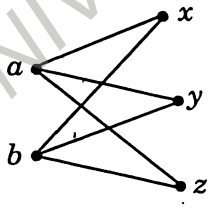
Answer any **four** *questions.*
Each question carries 10 *marks.*

III. (a) Consider the graph $K_{2,3}$ shown below and let $\lambda \in Z^+$ denote the number of colors available to properly color the vertices of $K_{2,3}$.

(i) How many proper colorings of $K_{2,3}$ have vertices a,b colored the same ?

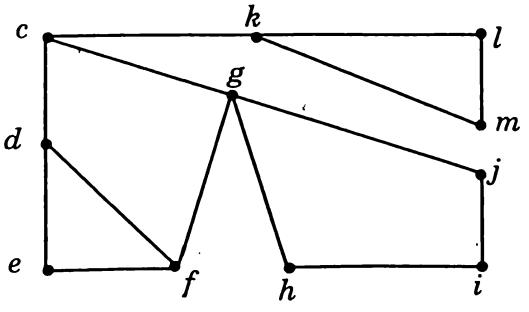
(ii) How many proper colorings of $K_{2,3}$ have vertices a,b colored with different colors ?

(iii) What is the chromatic polynomial for $K_{2,3}$? What is $X\left(K_{2,3}\right)$?



Or

(b) Find shortest path from d to other vertices in a following undirected graph :



IV. (a) Describe about inorder and postorder traversal with neat example.

Or

(b) Apply merge sort to the following list. Draw the splitting and merging trees for each application of the procedure :

$-1, 7, 4, 11, 5, -8, 15, -3, -2, 6, 10, 3.$

V. (a) For every positive integer n, show that

$$\binom{n}{0}+\binom{n}{2}+\binom{n}{4}+\ldots=\binom{n}{1}+\binom{n}{3}+\binom{n}{5}+\ldots.$$

Or

(b) Determine the number of integer solutions for $x_1+x_2+x_3+x_4+x_5<40$, where

(i) $x_i \geq 0, 1 \leq i \leq 5.$

(ii) $x_i \geq -3, 1 \leq i \leq 5.$

VI. (a) Solve the recurrence relation

$$a_{n+2}-6a_{n+1}+9a_n=3\left(2^n\right)+7\left(3^n\right).$$

where $n \geq 0$ and $a_0=1, a_1=4.$

Or

(b) Prove that any two Fibonacci numbers are relatively prime.

(4 × 10 = 40 marks)

C 84517 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2009 SCHEME) [SUPPLEMENTARY] EXAMINATION, APRIL 2020

Computer Science Engineering

CS 09 706 L14—INFORMATION THEORY AND CODING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*

1. What is Shannon's limit ? What information does it give about a communication channel ?
2. What is a binary symmetric channel ?
3. How minimum distance of a code is helpful in designing an encoder ?
4. Define BCH code.
5. What is meant byconstraint length and free distance of a convolution code ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

6. Define Discrete entropy H (X) and joint entropy H (X, Y) and Mutual information I (X ; Y).
7. Explain channel capacity theorem.
8. Describe standard array and syndrome decoding.
9. Explain the encoding method of a (7, 4) linear block code.
10. Define G and H matrix and show that $G.H^T = 0$.
11. Discuss on Reed-Solomon code.

(4 × 5 = 20 marks)

Part C

12. An information source produces a sequence of independent symbols having the following probabilities. Construct binary code using huffman encoding and find its efficiency :

A	B	C	D	E	F	G
1/4	1/36	1/4	1/12	1/12	1/36	1/36

Or

Turn over

13. A Memory less source emits six messages with probabilities {0.3, 0.3, 0.4, 0.2, 0.5}. Find the Shannon - Fano code and determine its efficiency.

14. Explain the properties of cyclic codes.

Or

15. Write a note on error detecting and error correcting capabilities of a block code.

16. Let GF(25) be represented by polynomials of degree < 2 with arithmetic modulo the polynomial $p(x) = x^2 + x + 2$, which is prime over GF (5). Perform the following calculation in GF (25). Find $(2x + 3) \cdot (3x + 4)$.

Or

17. Construct the vector space of all 3-tuples over GF (3). Form a two dimensional subspace and its duai space.

18. Explain any one application of Viterbi algorithm.

Or

19. Write a note on optimal decoding of convolutional codes.

(4 × 10 = 40 marks)

C 84515 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Computer Science Engineering

CS 09 705 L07/IT 09 705 L23—DISTRIBUTED SYSTEM

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*

I. a) List outthe advantages of using Distributed system.

b) State the purpose of using client server model.

c) Define Directory service.

d) State the need for Inter-process communication.

e) Define static process scheduling.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

II. a) Explain in detail about any one concurrent programming language.

b) Discuss in detail about distributed message passing communication.

c) Explain about client server model of a distributed system.

d) Explain in detail about distributed directory services.

e) Describe the concept of distributed file systems.

f) Write notes on static process scheduling.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*

III. a) Explain in detail about the different types of transparencies in distributed system.

Or

b) Discuss in detail about Distributed System Architecture with a neat sketch.

Turn over

IV. a) Explain in detail about distributed client server model.

Or

b) Elaborate about time service language mechanisms for synchronization.

V. a) Discuss in detail about the process of transaction communication.

Or

b) Write notes on distributed mutual exclusion with an example.

VI. a) Explain in detail about dynamic load balancing mechanisms.

Or

b) Enumerate and explain the concepts of distributed computer security.

(4 × 10 = 40 marks)

C 84514 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Computer Science Engineering

CS/IT/PTCS 09 704—CRYPTOGRAPHY AND NETWORK SECURITY

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*
Each question carries 2 *marks.*

I (a) Write the differences between active and passive security threats.

(b) What are the essential ingredients of a symmetric cipher ?

(c) What is the trapdoor in ECC system ?

(d) Mention the security services provided by digital signature.

(e) What is the difference between transport mode and tunnel mode ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

III. (a) Mention the strengths and weaknesses of DBS algorithm.

(b) A transposition block has 10 inputs and 10 outputs. What is the order of permutation group ? What is the key size ?

(c) Users A and B use the Diffie Heilman key exchange technique a common prime $q = 11$ and a primitive root alpha = 7.

(i) If user A has private key $X_A = 3$, What is A's public key Y_A ?

(ii) If user B has private key $X_B = 6$. What is B's public key Y_B ?

(iii) What is the shared secret key ? Also, write the algorithm.

(d) How will you find message digest using MD5 algorithm ? Explain in detail.

Turn over

(e) Why does PGP generate a signature before applying compression ?

(f) What are the positive and negative effects of firewall ?

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*

Each question carries 10 *marks.*

III. (a) Draw the general structure of DES and explain the encryption decryption process.

Or

(b) Describe the block cipher modes of operation in detail.

IV. (a) How are secret keys distributed by making use of public key cryptography ?

Or

(b) Compare RSA and DES Algorithm. Which one performs better ?

V. (a) Explain authentication protocols in detail.

Or

(b) How does PGP provide confidentiality and authentication service for *e*-mail and file storage applications ? Draw the block diagram and explain its components.

VI. (a) Describe packet filtering router in detail.

Or

(b) Draw the architecture of IP Security and explain the components.

(4 × 10 = 40 marks)

C 84513 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Computer Science Engineering

CS/PTCS 09 703—INTERNET TECHNOLOGY

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Define FTP.
2. List out the types involved in scheduling and policing mechanism.
3. With an example describe an interactive application.
4. Explain the basic principle of cryptography.
5. List the types of digital payments.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Explain the process of File Transfer mechanism
7. Write about the internet directory service.
8. Discuss the steps involved in making the best of the best effort service.
9. Write notes on access control management
10. What are the trends involved in Supply Chain management ?
11. Describe the characteristics of net marketers.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. a) Explain in detail the architecture of layer protocol.

Or

b) Explain socket programming in TCP with a pseudo code.

13. a) Explain about RSVP and its security services.

Or

b) Write about streaming audio and video systems in detail.

14. a) Explain in detail the CIA principle of cryptography.

Or

b) Describe the key distribution and certificate in detail.

15. a) Discuss various modes of e-commerce in detail.

Or

b) Explain in detail about B2B e-commerce and supply chain management.

(4 × 10 = 40 marks)

C 84512 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Computer Science Engineering

CS/PTCS 09 702—DESIGN AND ANALYSIS OF ALGORITHMS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*
Each question carries 2 *marks.*

1. Find O notation for the following function : $25n^2 + 23n + 10$.
2. Find the step count for the following program segment :

```
for i = 20 to 40
        for j = 1 to n
                g = g + 1 ;
        end
end
```

3. Consider 5 items along with their respective weights and profits. $w = (5, 10, 20, 30, 40)$ and $p = (30, 20, 100, 90, 160)$. Capacity of knapsack = 60. Find the optimal solution for the fractional knapsack problem.
4. Differentiate P and NP problems.
5. Discuss how randomness can be used to find integral of a continuous function.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Explain amortized weight balanced trees with an example.
7. Prove that Quick sort takes O (N log N) time to sort N elements on the average.

Turn over

8. Show how Prim's algorithm can be implemented using heap. What would be the time complexity of the algorithm ?

9. Explain absolute approximation and $f(n)$ approximation.

10. Show that Clique problem is NP-Complete.

11. Write a note on randomized sorting.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. Sort the following list in increasing order using merge sort technique. Write the algorithm and analyze the time complexity. $L = (2, 23, 91, 0, 19, 26, 12)$.

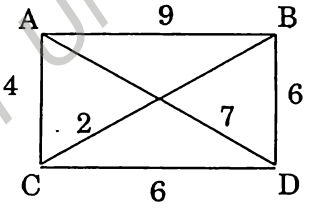
Or

13. Show that $W(n/3) + W(2n/3) + n$ is $O(n \log n)$ using recursive tree method.

14. Given the characters set $S = \{a, b, c, d, e, f\}$ with the following probability of occurrence $P = \{1, 1, 2, 3, 5, 8\}$, build a binary tree according to greedy strategy.

Or

15. Find the shortest tour of a TSP for the following graph using Branch and Bound method.



16. Explain bin-packing problem with an example.

Or

17. Show that the Boolean Satisfiability problem is NP Complete.

18. Explain Pollard's Rho method for prime factorization.

Or

19. Explain 8 queens problem and give a randomized solution for the same.

(4 × 10 = 40 marks)

C 84511 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2009 SCHEME) [SUPPLEMENTARY] EXAMINATION, APRIL 2020

Computer Science Engineering

CS/PTCS 09 701—WIRELESS NETWORKS AND MOBILE COMMUNICATION SYSTEM

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

1 Write a note on mobile node

2 What is meant by message routing ?

3 List the two aspects of GSM portability.

4 What is the use of resource allocation ?

5 Write a note on roaming.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

6. Describe the use of roaming management.

7. Explain the advantages of WAP service.

8. Draw the diagram for request-reply message structure.

9. Explain the process of roaming management.

10. What is CDPD ? Explain its implementation.

11. Discuss the challenges in wireless systems.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*

12 a) Discuss the major goals and design of a Handoff management.

Or

b) Explain about Wireless Telephony Applications.

Turn over

13. a) Explain the major issues of CDPD interface.

Or

b) Explain the design and implementation issues of TCAP.

14 a) Discuss the various issues of GSM network signaling

Or

b) Explain about GSM mobility management in detail.

15. a) Explain briefly about Packet radio service architecture with neat diagram.

Or

b) Explain briefly about GPRS network nodes.

(4 × 10 = 40 marks)

C 84508 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2009 SCHEME) [SUPPLEMENTARY] EXAMINATION, APRIL 2020

Civil Engineering

CE 09 706 L17—ARCHITECTURE AND TOWN PLANNING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

1. Define the term Architecture.
2. Write a detailed note on licensing of building works.
3. Mention the general requirements of site ?
4. Discuss in own words on pollution control aspects.
5. What do you mean by urban area delineation ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

6. Define the terms Scale.
7. Enumerate pictorial drawings.
8. Write short notes on regional planning.
9. Write a note on standard of roads and paths.
10. Write about space in architecture.
11. Define the terms proportion. How they are used in architectural design ?

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*

12. a) Explain how the principles are used in building design :

    i) Colour.

    ii) Unity and contrast.

Or

12. b) Explain in detail the main factors influencing architectural development.

13. a) Discuss the occupancy classification of buildings.

Or

13. b) Describe few points in introduction to computer aided design and drafting.

14. a) Explain Ebenezer Howard's concept of Garden city.

Or

14. b) Write short notes on the following : i) Town planning acts ; and ii) Evolution of towns.

15. a) Discuss on urban financing and land acquisition.

Or

15. b) Briefly explain the planning standards for traffic network.

(4 × 10 = 40 marks)

C 84507 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Civil Engineering

CE 09 706 L14—SOIL EXPLORATION, TESTING AND EVALUATION

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*

1. When will you prefer variable head permeability method ?
2. Explain standard penetration test.
3. What is the assumption made in field permeability ?
4. List the various methods that can be adopted for improving the Quality of rock.
5. What is the weakest type of rock ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

6. Discuss the various objectives of soil exploration.
7. Mention the different methods of boring.
8. How to prepare soil investigation report ?
9. Distinguish between compaction and consolidation.
10. What is necessity of doing the vane shear test ?
11. Different between laboratory and field test of rocks.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*

12. a) What are the methods of soil boring ? Explain in detail suitable sketches.

Or

b) Describe in detail about the procedure to be followed for the preparation of report on soil exploration.

Turn over

13. a) Derive the Terzagi's equation for the one dimensional consolidation process in soils.

Or

b) Discuss the pore pressure parameters in strength of soils. What are the uses of ? Applications of it ?

14. a) Explain the procedure of plate load test with neat sketch and state the Limitations.

Or

b) Write short notes on the following :

a) Dynamic cone penetration test.

b) Pressure meter test.

15. a) Describe the different techniques used for the testing of deformability of rocks.

Or

b) Explain in detail about the procedure of estimation of elastic modules of rock.

(4 × 10 = 40 marks)

C 84506 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2009 SCHEME) [SUPPLEMENTARY] EXAMINATION, APRIL 2020

Civil Engineering

CE 09 705 L10—HIGHWAY PAVEMENT DESIGN

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*

Each question carries 2 *marks.*

1. List the component parts of pavements structure.
2. Define modular ratio.
3. What is warping stresses ?
4. What is the purpose of pavement evaluation ?
5. List any *two* functions of the pavement.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

Each question carries 5 *marks.*

6. Discuss the role of sub base in road pavement.
7. What is equivalent wheel load factor ?
8. How many types of joints are in concrete pavement ?
9. What is Benkelman beam test ?
10. Compare flexible and rigid pavements.
11. What is Vehicle Damage Factor ?

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*

Each question carries 10 *marks.*

12. (a) Discuss about the factors Affecting Pavement Design.

Or

(b) Explain the design of Bituminous mixes by Marshall method.

13. (a) Explain CBR test for evaluating the sub-grade and base course materials for flexible pavements.

Or

(b) Design the flexible pavement by IRC method for construction of new highway with the following data :

No. of commercial vehicles as per last count = 1000

Period of construction = 3 years

Annual traffic growth rate = 8 %

Design CBR of subgrade soil = 10 %

Category of road - National Highways - Two lane Single carriage way.

14. (a) Explain Equivalent single wheel load.

Or

(b) Explain the function of various types of joints in cement concrete pavement.

15. (a) Discuss any *two* flexible pavement distress.

Or

(b) Define pavement evaluation and write the various methods for pavement evaluation.

(4 × 10 = 40 marks)

C 84505 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Civil Engineering

CE/PTCE 09 704—CONSTRUCTION ENGINEERING AND MANAGEMENT

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*
Each question carries 2 *marks.*

1. Define Slack.
2. What is backward planning ?
3. What are the things to be considered while the selection of hoe ?
4. Define a standing plan and single-use plan.
5. How is the MRP control used in inventory management ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. What are the various steps involved in the proces planning ? Explain each step.
7. A project is expected to take 15 months along the critical path, having a standard deviation of 3 months. What is the probability of completing the project within (a) 15 months ; (b) 18 months ; and (c) 12 months ?
8. A shovel with a 3-cy heaped capacity bucket is loading poorly blasted rock on a highway project. The average face height is expected to be 22 ft. The shovel has a maximum rated digging height of 30 ft. Most of the cut will require a 1400 swing of the shovel to load the haul units. What is a conservative production estimated in bank cubic yards ?
9. How the truck size affects productivity ? What are the advantages and limitations in both small and large trucks?
10. List the type of contract involved in the construction. Explain the (a) Lump sum contract ; (b) Cost plus fixed fee contract; (c) Cost plus bid fee contract ; and (d) Guaranteed Maximum contract.
11. Explain inventory controls, their objectives, and how to achieve them.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (a) The maintenance project of a building consists of ten jobs. The predecesor relationships are identified by their node number, as indicated below :

Job	*Identification*	*Job*	*Identification*
A	(1, 2)	F	(4, 5)
B	(2, 3)	G ...	(4, 7)
C ...	(2, 4)	H	(5, 8)
D	(3, 6)	I ...	(6, 8)
E ...	(3, 5)	J ...	(7, 8)

Draw the step-by-step development of network diagram for the project.

Or

(b) Explain the several levels of application in project development in the CPM process. Draw the block diagram for the same.

13. (a) Explain the commonly used loaders attachment and the SAE standards about fill factors for loader buckets.

Or

(b) An off-highway truck weights 70,000 lb empty and 150,000 lb when loaded. The weight distribution empty is 50 % front and 50 % rear. The weight distribution loaded is 33 % front and 67 % rear. The truck has two front tires and four rear tires. The truck works an 8-hr shift hauling rock to a crusher. The one-way haul distance is 5.5 miles. The truck can make 14 trips per day. Calculate the job TMPH value for the truck.

14. (a) Explain the Guaranteed Maximum Price (GMP) contract in detail and what are the Guaranteed Maximum Price (GMP) contract.

Or

(b) What are the types of tenders in construction management ? and List out any ten documents that must be furnished in tenders.

15. (a) Explain ABC analysis, its necessity, and the step that need to be followed, with a suitable diagram.

Or

(b) What are the chief provisions of a professional code framed for professional conduct, the confidence of clients, and the confidence of third parties ?

(4 × 10 = 40 marks)

C 84504 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2009 SCHEME) [SUPPLEMENTARY] EXAMINATION, APRIL 2020

Civil Engineering

CE/PTCE 09 703—ENVIRONMENTAL ENGINEERING–I

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

1. What is population density?
2. What are the types of investigation required for reservoir planning?
3. Define Darcy's Law.
4. What are the three factors that affect the hydraulic performance of fixed-spray pressure aerators?
5. Define Friction Head.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

6. Explain the factors that affect the population growth.
7. What are the factors considered for selecting the site for a reservoir?
8. Explain the types of aquifers used in groundwater hydrology with a neat sketch.
9. In an experiment on the removal of carbon dioxide from water sprayed into the air in spherical droples 5 mm in dia., the initial supersaturation of the water with CO_2 was 25.8 mg/l. After 1.2 seconds of exposure, this was reduced to 11.2 mg/l. Find the coefficient of gas transfer.
10. A filter unit is of size of 4 m × 8 m. After filtering 8000 m^3/day in 24 hour period, the filter is back washed at the rate of 10 litre/m^2/sec for 10 minutes. Compare the average filtration rate, quantity, and percentage of treated water used in washing and the rate of wash water flow in each trough. The unit has 4 troughs.
11. A city has a population of 1,50,000. Water is to be supplied at the rate of 160 litres per head per day. If the static lift of the pump is 40 metres, calculate the B.H.P. of motor. The rising main is 300 m long and its diameter is 50 cm. Assume that motor efficiency is 85%, pump efficiency is 60%. f = 0.04 and the peak hour demand is 1.5 times the average demand.

(4 × 5 = 20 marks)

Turn over

Part C

12. (a) What are the commonly used methods of installing a tube well in the ground? Explain with suitable diagram.

Or

(b) In order to determine the field permeability of a free acquifer, pumping out test was performed and following observations were made :

Diameter of well = 20 cm

Discharge from the well = 240 m^3./hr

R.L. of original water surface, before pumping started = 240.5 m

R.L. of water in the well at constant pumping = 235.6 m

R.L. of the impervious layer = 210 m

R.L. of water in observation well = 239.8 m

Radial distance of observations well from the tube well = 50 m.

Calculate k. Also calculate (i) the error in k if observations are not taken in the observation well, and radius of influence is assumed to be 300 m. (ii) actual radius of influence based on the observations of observation well.

13. (a) Design a bell mouth canal intake for a city of 80000 persons drawing water from a canal which runs for 10 hours a day with a depth of 1.8 m. Also, calculate the head loss in the intake conduit if the treatment works are ½ km away. Draw a neat sketch of the canal intake. Assume average consumption per person = 150 litre/day. Assume the velocity through the screens and bell mouth to be less than 16 cm/s and 32 cm/s respectively. Explain the types of aquifers used in groundwater hydrology with a neat sketch.

Or

(b) What are the methods of installing a tube well in the ground? and What are the significance each component in water?

14. (a) Define Aeration. What are the different types of aerators used? Explain with neat sketch.

Or

(b) Design a fixed spray aerators and mention its limitations.

15. (a) Explain the three different types of storage and distribution reservoirs in detail.

Or

(b) A pump is to deliver water from an underground tank against a static head of 30 m. The suction pipe is 40 m long and is of 30 cm with Darcy-Weisbach friction factor f = 0.02. The delivery pipe is of 25 cm diameter, 1500 m long and has f = 0.022. The pup characteristics can be expressed as

$$H_p = 100 - 6000\ Q^2$$

where H_p = pump head in metres and Q = discharge in m^3/s. Calculate the head and the discharge of the pump.

(4 × 10 = 40 marks)

C 84503 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) [2009 SCHEME] (SUPPLEMENTARY) DEGREE EXAMINATION, APRIL 2020

Civil Engineering

CE/PTCE 09 702—DESIGN OF HYDRAULIC STRUCTURES

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Sketch the practical profile of a high gravity dam.
2. Enumerate various factors deciding location of canal fall.
3. What is the use of surplus weir ?
4. Why Siphon well drops are necessray in canals ?
5. What is cross drainage work ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

1. Sketch the practical profile of a low and high gravity dam, giving details of various parameters like top width, bottom width etc.
2. Write brief note on the requirements to fulfilled by a canal outlet.
3. Write short note on drainage galleries.
4. What is meant by "falls" and where ae they loaded ?
5. Discuss the factors affecting the selection of a suitable cross drainage work.
6. Differentiate aqueduct, super passage and canal syphon.

(4 × 5 = 20 marks)

Part C

1. Design a tank sluice with tower head for the following hydraulic particulars :

Ayacut	:	68.6 hectares
Duty	:	723 hect/cumec
Top width of bund	:	1.80 cm.

Front slope	:	+ 1½ : 1
Rear slope	:	+ 2 : 1
Tank bund level	:	+ 20.20 m.
Maximum water level	:	+ 18.90 m.
Full tank level	:	+ 18.30 m.
Highest field level	:	+ 14.60 m.
Lowest field level	:	+ 12.20 m.

Assume any other relevant data.

(20 marks)

Draw a suitable scale for the following views :

(i) Longitudinal section. (10 marks)

(ii) Half plan at top and half plan at foundation level. (10 marks)

Or

2. Design a canal drop with the following data ;

Hydraulic particulars of the canal above drops :

Full supply discharge	:	5 $m.^3/s$
Bed width	:	7.00 m.
Bed level	:	+ 15.00 m.
Full supply depth	:	2.00 m.
Full supply level	:	+ 17.00 m.
Top of bank 2.50 m. wide at water level	:	+ 18.00 m.
Half supply depth	:	1.25 m.

Hydraulic particulars of the canal below drops :

Full supply discharge	:	5 $m.^3/s$
Bed width	:	7.00 m.
Bed level	:	+ 13.00 m.
Full supply depth	:	2.00 m.
Full supply level	:	+ 15.00 m.
Top of bank 2.50 m. wide at water level	:	+ 16.00 m.
The ground level at site of work is	:	+ 16.00 m.
Good soil is available for foundation at	:	+ 14.00 m.

(20 marks)

Draw the following view to a suitable scale :

Plan half at top and half at foundation. (10 marks)

Longitudinal section. (10 marks)

C 84502 (Pages : 4) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2009 SCHEME) [SUPPLEMENTARY] EXAMINATION, APRIL 2020

Civil Engineering

CE/PTCE 09 701—STRUCTURAL DESIGN—III

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*

Each question carries 2 *marks.*

1. State the assumptions in the Design of Compression Members by Limit State of Collapse.
2. List any *four* shallow footings.
3. What are piles ?
4. List the methods to analyses the Design of Circular Tanks resting on ground with rigid base.
5. Give the limitations of prestressed concrete.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

Each question carries 5 *marks.*

6. Classify Columns based on the loading with sketches showing loading.
7. Discuss the type of foundation needed for poor condition of soil near to the surface or when the bearing capacity is very less, with its advantages and disadvantages.
8. Describe the general design considerations of reinforced water tanks along with any two crack controlling methods.
9. Explain elastic shortening of a pre-tensioned bending member with sketches.
10. List the different types of bridge bearings.
11. Sketch two common types of plate girder bridge and give the indicative range for overall dimension of the main girders.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. Design the reinforcement in a column of size 400 mm. × 600 mm. subjected to an axial load of 2000 kN under service dead load and live load. The column has an unsupported length of 4.0 m. and effectively held in position and restrained against rotation in both ends. Use M 25 concrete and Fe 415 steel as shown in Figure 1.

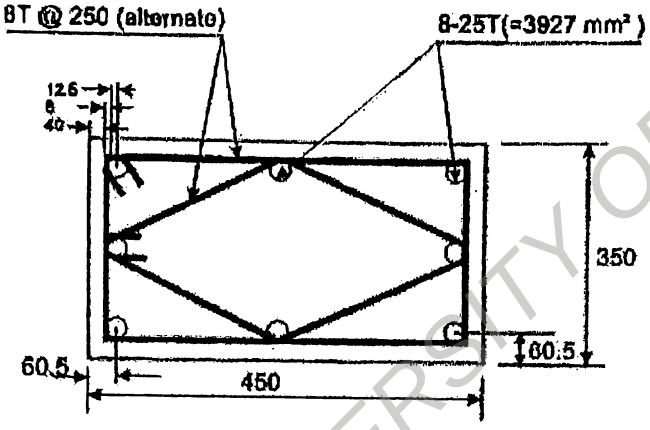


Figure 1

Or

13. Design an isolated footing of uniform thickness of a RC column bearing a vertical load of 600 KN and having a base of size 500 × 500 mm. the safe bearing capacity of soil may be taken as 120 KN/m^2. Use M 20 concrete and Fe 415 steel.

14. Design a cantilever retaining wall to retain an earth embankment with a horizontal top 4 m. above ground level. Density of earth = 18 kN/m^3. Angle of internal friction is 30°. SBC of soil = 200 kN/m^2. Co-efficient of friction between soil and concrete is 0.5. Adopt M 20 grade concrete and Fe 415 HYSD bars.

Or

15. A flat slab system of a ware house is 24 m. × 24 m. and divided into 6 m. × 6 m. (interior slab) along column center lines. Loading is estimated as 5 KN/m^2. Supporting column diameter is 400 mm. Choosing the thickness of the slab (from stiffness criteria) and appropriate dimensions for column head and drops as shown in Figure 2. Design the Interior Panel.

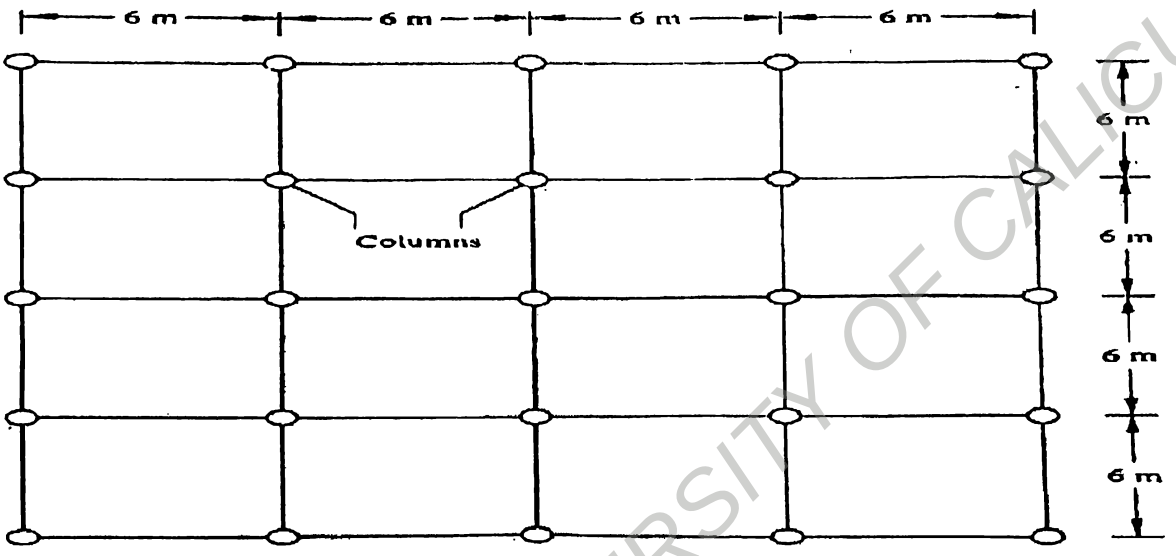


Figure 2

16. A prestressed concrete sleeper produced by pre-tensioning method has a rectangular cross-section of 300 mm. × 250 mm. ($b \times h$). It is prestressed with 9 numbers of straight 7 mm. diameter wires at 0.8 times the ultimate strength of 1570 N/mm^2 as shown in Figure 3. Estimate the percentage loss of stress due to elastic shortening of concrete. Consider $m = 6$.

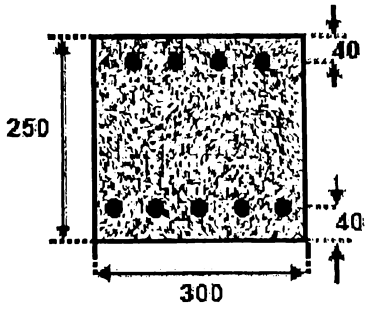


Figure 3.

Or

17. A concrete beam of dimension 100 mm. × 300 mm. is post-tensioned with 5 straight wires of 7 mm. diameter. The average prestress after short-term losses is $0.7f_{Pk}$ = 1200 N/mm^2 and the age of loading is given as 28 days. Given that E_p = 200 × 10^3 MPa, Ec = 35000 MPa, find out the losses of prestress due to creep, shrinkage and relaxation. Neglect the weight of the beam in the computation of the stresses as shown in Figure 4.

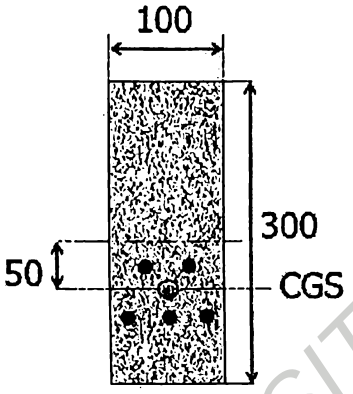


Figure 4.

18. Design a welded plate girder of span 24 m. to carry superimposed load of 35 kN/m. Avoid use of bearing and intermediate stiffeners. Use Fe 415 (E250) steel.

Or

19. A welded plate girder 20 m. in span and laterally supported throughout is simply supported at the ends. It has to support a UDL of 100 KN/m. (factored) including self-weight. Design the central section of the plate girder without intermediate vertical stiffeners. Also design curtailment of flange plates, end bearing stiffener and connection between flange and web using fillet welds.

(4 × 10 = 40 marks)

C 84499 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2009 SCHEME) [SUPPLEMENTARY] EXAMINATION, APRIL 2020

Chemical Engineering

CH/PTCH 09 704—BIOCHEMICAL ENGINEERING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

1. List any four important microbial strains used in industries and mention the bioproducts.
2. Define recombinant DNA.
3. Write the effect of bubble break up on cell disruption.
4. What is the significance of saturation constant in Monod kinetic model ?
5. Write the principle of paper chromatography technique.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

6. Outline the steps involved in bioprocess development.
7. Describe quaternary structure of protein with neat sketch.
8. With a neat diagram, explain the steps involved in the transfer of oxygen from gas bubbles to microbial cells in a reactor. Mention the resistances involved in the process with suitable explanations.
9. What are enzymes ? Classify enzymes, give examples and mention their application.
10. Draw the bacterial growth curve and mention the kinetic equations in each stage.
11. Explain the principle of gel permeation chromatography technique used in protein purification.

(4 × 5 = 20 marks)

Turn over

Part C

12. a) Draw the cell wall structure of gram-positive and gram-negative bacterial cells and highlight their differences.

Or

b) What are vitamins ? Classify them and mention their functions.

13. a) The growth of baker's yeast (*S. cerevisiae*) on glucose may be simply described by the following equation :

$$C_6H_{12}O_6 + 3\ O_2 + 0.48\ NH_3 \rightarrow 0.48\ C_6H_{10}NO_3 + 4.32\ H_2O + 3.12\ CO_2$$

In a batch reactor of volume 10^5 L, the final desired yeast concentration is 50 gdw/l, using the above reaction stoichiometry:

i Determine the concentration and total amount of glucose and $(NH_4)2SO_4$ in the nutrient medium.

ii Determine the yield coefficients $Y_{X/S}$ (biomass/glucose) and $Y_{X/O2}$ (biomass/oxygen).

iii Determine the total amount of oxygen required.

iv If the rate of growth at exponential phase is r_x = 0.7 gdw/l-h, determine the rate of oxygen consumption (g O_2/L – *h*).

Or

b) A cylindrical stirred bioreactor of diameter and height 2 m has a Rushton turbine one-third the tank diameter in size. The bioreactor contains Newtonian culture broth with the same density as water and with viscosity 4 cP.

i) If the specific power consumption must not exceed 1.5 $kW.m^{-3}$, determine the maximum allowable stirrer speed. What is the mixing time under these conditions ?

ii) The tank is now aerated. In the presence of gas bubbles, the approximate relationship between ungassed power number $(N_P)_0$ and gassed power number $(N_P)_g$ is : $(N_P)_g = 0.5\ (N_P)_0$. What maximum stirrer speed is now possible in the sparged reactor ? Estimate the mixing time.

14. a) The enzyme, urease, is immobilized in Ca-alginate beads 2 mm in diameter. When the urea concentration in the bulk liquid is 0.5 mM the rate of urea hydrolysis is υ = 10 mM/h. Diffusivity of urea in Ca-alginate beads is De = 1.5×10^{-5} cm^2/s, and the Michaelis constant for the enzyme is K_m' = 0.2 mM. By neglecting the liquid film resistance on the beads (i.e.,[So] = [Ss]) determine the following :

i) Maximum rate of hydrolysis V_m, Thiele modulus (Φ), and effectiveness factor (η).

ii) What would be the Vm, Φ, and η values for a particle size of D_p = 4 mm?

Or

b) Derive equations to express biomass concentration and residual substrate concentration in a continuous reactor.

15. a) Describe the principle and application of nanofiltration process used in purification of bioproduct.

Or

b) Describe the steps involved in the production and purification of penicillin.

(4 × 10 = 40 marks)

C 84498 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2009 SCHEME) EXAMINATION, APRIL 2020

Chemical Engineering

CH/PTCH 09703—SAFETY ENGINEERING IN PROCESS PLANTS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 marks.

1. Write any four tenets of safety.
2. Define auto-ignition temperature and maximum mixing length.
3. Differentiate hazard identification and hazard analysis.
4. Explain the significance of Risk Priority Number.
5. List the different types of explosions.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 marks.

6. Explain the guidelines for safe storage of hazardous chemicals.
7. Explain the safe practices to be ensured by a safety engineer prior to working in confined work spaces.
8. Explain how risk is assessed when working with a pressure system.
9. Differentiate safety inspection and safety audit with reference to their scope and procedure.
10. Elaborate the features of fire protection systems used in petroleum refineries.
11. Explain the types of alarms used for emergency procedures in process industries.

(4 × 5 = 20 marks)

Turn over

Part C

Answer any **one** *question from each module.*
Each question carries 10 marks.

Module I

12. Explain the safety aspects involved in the site selection and lay out of process industries

Or

13. Explain the purpose, design features and types of rupture discs.

Module II

14. Define and explain hazard, toxicity, flammability, threshold limit value and accident with appropriate examples.

Or

15. Explain the preventive and protective measures to avoid fire in chemical industry.

Module III

16. What is job safety analysis and explain the steps associated with it. Prepare 8 questions to identify potential risks in a process industry as a part of job safety analysis.

Or

17. Explain the objectives and types of FMEA.

Module IV

18. Illustrate fire triangle ? What do you understand by fire prevention, fire protection and fire lighting? What are the various ways of extinguishing fire ?

Or

19. Distinguish between fires and explosion. Explain the various types of explosion.

(4 × 10 = 40 marks)

C 84497 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2009 SCHEME) [SUPPLEMENTARY] EXAMINATION, APRIL 2020

Chemical Engineering

CH/PTCH 09 702—TRANSPORT PHENOMENA

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

1. Define thermal conductivity.
2. Give the statement of boundary condition for liquid-liquid interfacial plane in solving viscous problems.
3. Draw the schematic of falling film experiment showing end effects.
4. Write the equation of change for temperature, in terms of the heat flux vector and the viscous momentum flux tensor.
5. Express the relation for molar rate of production of species A for a homogeneous reaction.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

6. Estimate the viscosity of liquid benzene, C_6H_6 at 20°C (293.2K).
7. Compute the viscosity of CO_2 at 200, 300 and 800 K and 1 atm.
8. A copper wire has a radius of 2 mm and a length of 5 m. For what voltage drop would the temperature rise at the wire axis be 10°C, if the surface temperature of the wire is 20°C ?
9. Express the relations for quantities that can be calculated once the velocity distribution is known in a falling film problem.
10. Calculate the heat loss from a rectangular fin for the following conditions.

Air temperature	...	350°F
Wall temperature	...	500°F
Thermal conductivity of fin		60 Btu/hr.ft.F
Thermal conductivity of air	...	0.0022 Btu/hr.ft.F

Heat transfer coefficient	120 Btu/hr.ft^2. F
Length of fin	0.2 ft
Width of fin	1.0 ft
Thickness of fin	0.16 inch.

11. Write the boundary conditions for shell mass balance.

(4 × 5 = 20 marks)

Part C

12. a) Predict the viscosities (in cp) of chiorine-air mixtures at 75 °F at 1 atm, for the following mole fractions of chlorine : 0.00, 0.25, 0.50, 0.75, 1.00. Consider air as single component.

Or

b) Explain molecular theory of viscosity for gases at low density.

13. a) Determine the radius of capillary tube from the following data:

Length of capillary tube	50.02 cm
Kinematic viscosity of liquid	4.03×10^{-5} m^2/s
Density of liquid	0.9552×10^3 kg/m^3
Pressure drop in the horizontal tube	4.829×10^5 Pa
Mass flow rate through tube	2.997×10^{-3} kg/s

What difficulties may be encounters in this method ? Suggest some other methods for determining radii of capillary tubes.

Or

b) Derive the continuity equation in differential form.

14. a) Discuss about shell energy balance with boundary conditions.

Or

b) A copper wire of 0.040 in. diameter is insulated uniformly with plastic to an outer diameter of 0.12 in. and is exposed to surroundings at 100 °F. The heat transfer coefficient from the outer surface of the plastic to the surroundings is 1.5 Btu/hr ft^2 F. What is the maximum steady current, in amperes, that this wire can carry without heating any part of the plastic above its operating limit of 200 °F ? The thermal and electrical conductivities may be assumed constant at the values given here :

	k (Btu/hr.ft.F)	k_e (ohm^{-1} cm^{-1})
Copper	220	5.1×10^5
Plastic	0.20	0.0

15. a) Explain diffusion with a heterogeneous chemical reaction.

Or

b) A sphere of iodine 1 cm in diameter is placed in still air at 40°C and 747 mm Hg pressure. At this temperature the vapour pressure of iodine is about 1.03 mm Hg. Estimate the diffusivity for the iodine—air system at the temperature and pressure given, using the intermolecular force parameters. Also find the rate of sublimation (Assume r_2 to be very large.)

(4 × 10 = 40 marks)

C 84496 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2009 SCHEME) [SUPPLEMENTARY] EXAMINATION, APRIL 2020

Chemical Engineering

CH/PTCH 09 701—CHEMICAL ENGINEERING DESIGN AND DRAWING—I

Time : Three Hours Maximum : 70 Marks

Answer any **one** *question from each module.*
Design data book may be permitted.
Make the suitable assumptions, if required.

Module 1

1. Illustrate the P and ID symbols for valves with neat sketch.

(20 marks)

Or

2. Illustrate the I and C drawing for the packed bed distillation column with the half sectional elevation and plan view.

(20 marks)

Module 2

3. Explain in detail about the determination of various stresses developed in tall columns.

(25 marks)

Or

4. A tank is to store 24000 kg of liquid having density 900kg/m^3. Due to space limitations the maximum tank diameter can be 2.4 m. calculate the height of the tank. Liquid is to be filled upto roof to shell junction. No corrosion allowance is necessary welding joint efficiency is 85%. Permissible stress of the material= 1020 kglcm^2 .

Weight of the liquid = 24000 kg.

(25 marks)

Turn over

Module 3

5. The bottom liquid product of a fractionation column is to be cooled from 80°C to 40°C at the rate of 2700 kg/hr. cooling water is available at 30°C.

The following data is available.

	Bottom product	*Water*
Heat capacity, Cp (J/Kg K)	1400	4180
Thermal conductivity (W/mK)	0.096	0.66
Viscosity (N-S/$m^2 \times 10^{-3}$)	0.4	0.72
Density (Kg/m^3)	780	1000

Design a suitable heat exchanger and draw the elevation with the plan of the designed heat exchanger. Assume outlet temperature of water is 35°C. Water is circulated on tube side. Tubes of 25 mm outside diameter and 1.5 mm wall thickness arranged on 31 mm square pitch are selected with tube length as 2.0 m. Assume single pass on shall side, four passes on tube side with square pitch (n = 2.263 and k = 0.158) and overall heat transfer coefficient between 250 to 750 w/m^2 k. Fouling resistance on shall side = 0.0002 m^2K/W. Fouling resistance on tube side = 0.0004 m^2K/W.

(25 marks)

Or

6. Ammonia vapors are to be condensed at 1500 KN/m^2. Saturation temperature of ammonia vapors is equal to 42 °C. Flow rate of vapors = 0.3 Kg/sec. Water is available at 28 °C and heated up to 33 °C. 25 mm outside diameter with 2 mm thickness tubes arranged on triangular pitch of 31 mm and 5 meter in length are available. Number of passes = 4 (k = 0.158 and n = 2.263). Overall heat transfer coefficient for condensing ammonia vapors = 1000 W/m^2 K. Properties of liquid ammonia :

Density = 600 kg/m^3, Viscosity = 0.085 × 10^{-3} N.S/m^2, Thermal conductivity = 0.502 W/mK. Fouling factor on ammonia side = 0.0002 m^2K/W. Fouling factor on water side = 0.0004 m2K/W. Latent heat of ammonia vapors = 1092 kJ/kg. Thermal conductivity of water = 0.63 W/mK. Viscosity of water = 0.7 X 10^{-3} N.S/m^2.

Calculate the heat load, heat transfer surface area, water flow rate required, tube bundle diameter, tube side heat transfer coefficient and heat transfer coefficient for the condensing vapour. Design a suitable horizontal type condenser and draw the half sectional elevation with side view of the designed condenser.

(25 marks)

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC 14 705 (E)—BIOMEDICAL INSTRUMENTATION

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. What is an Electro-Oculogram (EOC) ? Explain.
2. With a simplified diagram of the Central Nervous System (CNS), illustrate the general pathway from the periphery to the brain.
3. Give the equivalent circuit of metal microelectrode.
4. Distinguish between Extravascular Sensors and Intravascular Sensors.
5. Name the two basic causes of abnormal heart murmurs. For each type give an example and show on a sketch when it occurs relative to systole and diastole.
6. Explain Photoplethysmography.
7. List the various physiological variables and the sensors used in Rate-Responsive Pacemakers.
8. What are Cardioverters ? Explain.
9. What is a Let-Go Current ? Give its minimal threshold value.
10. A blood specimen has a hydrogen ion concentration of 40 nmol/litre and a PCO_2 of 60 mm Hg. What is the pH ? What type of acid-base abnormality does the patient exhibit ?

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. (a) Describe the electrical activity of Excitable Cells.

Or

(b) In many forms of peripheral neuropathies, the excitability of some neurons is changed and their conduction velocities are consequently altered. Describe the effect that this might have on an EMG recording and an muscular contraction.

Turn over

12. (a) (i) Explain the hormonic analysis of blood-pressure waveforms.

(ii) Describe the dynamic properties of pressure-measurement systems.

Or

(b) Explain the principle of working of :

(i) Electromagnetic flowmeter. (8 marks)

(ii) Ultrasound flowmeter. (7 marks)

13. (a) (i) Explain Cocklear and Visual Prothesis. (8 marks)

(ii) Briefly explain the working of a pump oxygenarators. (7 marks)

Or

(b) Discuss in detail about Hemodialysis.

14. (a) Explain the measurement of :

(i) pH. (7 marks)

(ii) PCO_2. (8 marks)

Or

(b) Describe the important susceptibility parameters.

[4 × 15 = 60 marks]

83791 D Pages (2) Name: .....

Reg. No.: .....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME)

(SUPPLEMENTARY) EXAMINATION, APRIL 2020

Printing Technology

PT 14 704 D – NEWSPAPER & PERIODICAL PUBLISHING

Time: Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

Each question carries 5 *marks.*

1. Discuss the determinants to work.
2. Write notes on different types of newspapers.
3. What are the characteristics of Print Media? Discuss.
4. Discuss 5 types of headlines.
5. Explain the situations in which working rough layout is used.
6. Write notes on the following determinants of news;

   a) Unusual b) Impact
7. Discuss features and types of advertisements as a design element for newspaper.
8. Write notes on beat system.
9. Describe magazine and mention its characteristics.
10. Explain the process of shaping sentences and paragraphs in copyediting.

(8x5 = 40 marks)

Part B

Answer **all** *questions.*

Each question carries 15 *marks.*

11. A) Discuss various properties of newsprint that affects printability. (8 marks)

    B) What are duties of various dept members of newspaper organization? Discuss. (7 marks)

Or

12. Explain different ways of marketing newspaper

Turn over

13. A) With the help of a sketch, explain various parts of a newspaper. (8 marks)

    B) Describe the functions of a headline. (7 marks)

Or

14. A) Explain different stages of layout planning. (10 marks)

    B) Explain the importance of graphics or diagrams in newspaper. (5 marks)

15. Discuss various sources of news for newspaper.

Or

16. Explain the 2 processes of creative and substantive editing in manuscript editing.

17. Discuss on completing books and journal issues.

Or

18. A) What are the different styles of writing magazine? Explain. (7 marks)

    B) What are the different types of features in a magazine? (8 marks)

(4 x15 = 60 marks)

C 83791-C (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Printing Technology

PT 14 703—QUALITY CONTROL AND STANDARDISATION

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Discuss the cost involved in implementation of ISO in an organisation.
2. Explain the applications of twenty step tone scale in GATF test form.
3. What are the factors to be considered while deriving the specifications for printing production process ? Explain.
4. How do you select a right control strip for quality print production ?
5. Explain the procedure to plot a print characteristic tone curve for positive working plates.
6. Write the significance of a Vignette Target in detail.
7. Control charts were maintained on the tensile strength of a Parchment paper. After 35 lots, with sample size $n = 6$, the following data was obtained.

   $\sum \bar{x} = 1287$ and $\sum R = 135$

   a) Compute control limits on the R and X bar charts and plot the graphs.

   b) Determine whether the process is in control or not ?
8. What are the factors affect the selection of ink sequence in four color printing ? Explain in detail.
9. Define the term "Print density" and explain the procedure of measuring print density.
10. In a production line of sheet fed coating machine, the average number of nonconformities per coating machine is estimated to be 45. The quality engineer wishes to establish a C chart for this operation, using an inspection unit of 6 sheet fed coating machines. Find the 3 sigma limits for this chart.

(8 × 5 = 40 marks)

Turn over

Part B

Answer **all** *questions.*

Each question carries 15 *marks.*

11. Discuss the quality cost categories and their inter relationship in detail.

Or

12. Define "Quality" and explain the term "Quality control" in detail.

13. Explain the effect of followings on print characteristics :

    a) Ink density and hue.

    b) Secondary and tertiary color.

Or

14. Explain the procedure to plot print characteristic tone curve and TVI curve for offset plate.

15. Explain the design and purpose of the following test chart elements :

    a) Single Tier Control Bar.

    b) Six color Two-tiered Control Bar.

Or

16. Describe the design and application of following Test Charts in quality control and standardisation of printing press :

    a) Ink Coverage Target.

    b) Line resolution Target.

17. Construct a fraction defective chart for the following data and find whether the process is in control or not ? Revise the limits if found out of control :

SI. No	1	2	3	4	5	6	7	8	9	10
No of samples :	200	230	212	223	248	246	265	234	213	233
No of defectives :	10	8	4	6	2	12	8	9	5	7

Or

18. The following data were collected from a process manufacturing offset rubber blankets. The quality characteristic under study was blanket hardness with sample size 6. Construct a X bar and R chart for the data using moving range method and determine if the process of roller manufacturing is in control or not ?

Lot No	1	2	3	4	5	6	7	8	9	10
Average blanket hardness	53	58	54	55	58	53	57	55	56	54
Lot No	11	12	13	14	15	16	17	18	19	20
Average blanket hardness	55	53	52	55	50	55	56	52	55	57

(4 × 15 = 60 marks)

83791 B Pages (2) Name: .....

Reg. No.: .....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME)

(SUPPLEMENTARY) EXAMINATION, APRIL 2020

Printing Technology

PT 14 702 – PACKAGING TECHNOLOGY

Time: Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

Each question carries 5 *marks.*

1. What is the influence of package shape in selecting a product?
2. Discuss the functions of a package.
3. Give an account of package components.
4. What are the 2 types of package? Explain.
5. What are the Factors or parameters to be considered for deciding suitability of glass for particular application?
6. Discuss the 5 methods of preserving wood.
7. Describe gas packaging and its types.
8. Describe blister packaging and its advantages.
9. With neat diagram, explain the process of plug assist forming.
10. Write notes on advancements in food packaging.

(8x5 = 40 marks)

Part B

Answer **all** *questions.*

Each question carries 15 *marks.*

11. A) Explain the 5 types of corrosion. (10 marks)

B) Explain the process of manufacturing expanded polystyrene and its applications. (5 marks)

Or

12. Discuss various classification of cushioning materials.

13. Explain the features of various types of papers and boards used for packaging.

Or

14. Explain the manufacturing process, properties and applications of aluminium foil.

15. A) With neat diagram, explain the process of manufacturing corrugated board. (7 marks)

    B) Describe vacuum packaging and explain its benefits (8 marks)

Or

16. A) With neat diagram, explain the working principle of aerosol. (7 marks)

    B) With neat diagram, explain injection blow moulding. (8 marks)

17. A) With neat diagram, explain the working of horizontal form-fill-seal machine (7 marks)

    B) Explain the features and 2 methods of manufacturing tin plates. (8 marks)

Or

18. A) Write notes on collapsible tubes, its advantages and disadvantages. (7 marks)

    B) Discuss the importance of labeling in various areas and its basic elements. (8 marks)

(4 x15 = 60 marks)

83791 A Pages (2) Name: .....

Reg. No.: .....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME)

(SUPPLEMENTARY) EXAMINATION, APRIL 2020

Printing Technology

PT 14 701 – TONE AND COLOR ANALYSIS

Time: Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

Each question carries 5 *marks.*

1. What are the different types of transparencies? Explain.
2. Explain Positive and Negative Masking techniques in detail.
3. Explain the process of color separation in print production.
4. What is the need of color management systems in a pre-press? Explain in detail.
5. Explain the difference between metamerism and color blindness of an eye.
6. How are color correction done on professional digital photograph? Explain.
7. What is positive dot etching? Explain.
8. How is AM and FM screening different from each other?
9. With a diagram, explain the basic elements of scanners.
10. Explain in detail the CIE color standards and its advantages.

(8x5 = 40 marks)

Part B

Answer ***all*** *questions.*

Each question carries 15 *marks.*

1. What is masking and how it can be done to scanned images? Explain

Or

2. Explain the different types of densities with a neat diagram

Turn over

3. Explain CMM with the principles of color management

Or

4. What are the print characteristics which can be measured using spectrophotometer? Explain.

5. Explain the different types of color models available Color management systems for printing domain.

Or

6. What are the principles and functions of color management and color engines?

7. Explain the different types of scanning methods and write their advantages.

Or

8. Explain the different types of color corrections which can be performed on scanned color images.

(4 x15 = 60 marks)

C 83790 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME]
{SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electronics and Communication Engineering

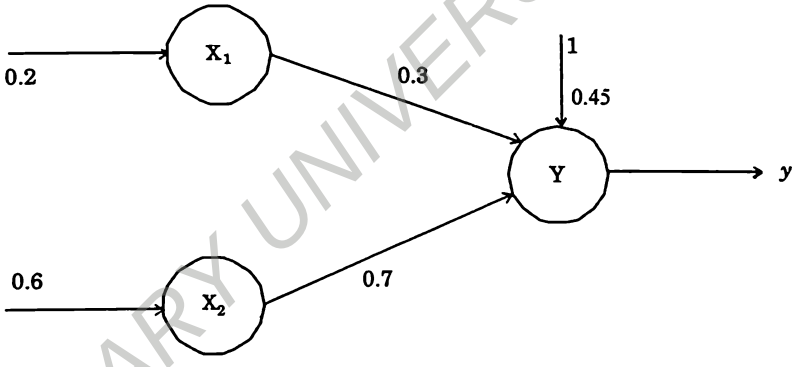
EC 14 705 (A)—SOFT COMPUTING

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Briefly explain the various components under Soft Computing.
2. Explain supervised learning and unsupervised learning.
3. Explain the following terminologies of a neural network :
   (i) Weights ; (ii) Bias ; and (iii) Threshold.
4. Draw the flowchart of Hebb training algorithm.
5. Calculate the net input for the network shown in figure with bias included in the network



6. Write a brief note on Adaptive BP and GA based BP.
7. What is the cardinality of a fuzzy set ? Whether a power set can be formed for a fuzzy set ?
8. Explain formation of rules and decomposition of rules.
9. Briefly explain the similarities between GA and other traditional methods.
10. Write the function theoretic form representation of crisp set operations.

(8 × 5 = 40 marks)

Turn over

Part B

Answer **all** *questions.*

Each question carries 15 *marks.*

11. (a) Derive the perceptron learning rules and explain its.

Or

(b) Derive the expression for extended delta learning rule.

12. (a) Discuss the architecture, training and testing algorithm of BPNN.

Or

(b) Discuss the influence of following parameters on the performance of BPNN :

(i) Momentum factor.

(ii) Learning rate.

(iii) Epochs.

13. (a) Discuss the logic of fuzzification and defuzzification.

Or

(b) Explain the Construction and Working Principle Fuzzy Inference Systems and its methods.

14. (a) With flow chart, explain the operation of a simple genetic algorithm.

Or

(b) Explain :

(i) Roulette-Wheel Selection.

(ii) Boltzman Selection.

(4 × 15 = 60 marks)

C 83789 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC 14 704 (E)—IMAGE AND VIDEO PROCESSING

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Explain Image reconstruction.
2. Write a note on Image data compression.
3. Explain any four properties of two-dimensional fourier transform.
4. Explain the concept of homomorphic filtering.
5. How contrast adjustment is done in an Image ? Explain.
6. Explain moving MA and ARMA representations.
7. Explain MAP Estimation.
8. List the steps involved in two-dimensional logarithmic search.
9. Briefly explain CCIR standards for video.
10. Explain Inter-Frame and Intera-Frame coding.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. (a) With block diagram, explain the typical digital image processing technique.

Or

(b) Explain Image representation and modeling.

12. (a) Derive the relationship between DFT and DCT co-efficients of an image.

Or

(b) Explain KL Transform. Consider the 2 × 2 matrix $\begin{bmatrix} 4 & -2 \\ -1 & 3 \end{bmatrix}$. Obtain the KL transform co-efficient of the matrix.

Turn over

13. (a) Generate the Huffman code for the sequence a3, a2, a3, a1, a3, a2, a1, a2, a4 with following probabilities :

P (a1) = 0.25, P (a2) = 0.35, P (a3) = 0.3, P (a4) = 0.1 and also calculate the efficiency of the code.

Or

(b) Explain Inverse and pseudo inverse filter.

14. (a) Discuss in detail about the features of MPEG4 standard.

Or

(b) (i) Explain motion compensation. (7 marks)

(ii) Explain content based video indexing. (8 marks)

[4 × 15 = 60 marks]

C 83787 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC 14 704 (C)—EMBEDDED SYSTEMS

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. List the requirements of a remote control used in TV ?
2. Explain the uses of EEPROM, flash and OTP.
3. Explain about task and task states ?
4. How security is provided for operating system ?
5. Explain about CPU registers of PIC microcontroller ?
6. What are the operating modes of 68HC11 ? Explain ?
7. Draw and explain the I/O port configuration of 8096.
8. Design a circuit to interface two switches and two LED to a microcontroller.
9. Explain the function of assembler and compiler.
10. Distinguish between synchronous, Iso-synchronous and asynchronous types of serial communication.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. With three different applications as an example, explain the low processor and memory systems are selected. (15 marks)

Or

12. Describe any *two* applications of Embedded Systems in detail. (15 marks)

Turn over

13. Discuss about timer, interrupt service routines and memory management in RTOS.

Or

14. Describe the development of RTOS in detail.

15. With suitable diagram explain the architecture of PIC.

Or

16. Explain about interrupts and timers of 68HC11.

17. Design a circuit to interface :

    (i) Analog to Digital convertor ; and

    (ii) Stepper motor.

    to a microcontroller.

Or

18. (a) State the purpose of IDE ? Explain its function. (8 marks)

    (b) Design a circuit to interface External Memory. (7 marks)

[4 × 15 = 60 marks]

C 83786 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) [SUPPLEMENTARY] EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC 14 704 (B)—TELEVISION AND RADAR ENGINEERING

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. What is raster and how it is produced on the picture tube screen ?
2. Why FM is preferred to AM for sound signal transmission ?
3. What is vestigial sideband transmission and why it is used for transmission of TV picture signals ?
4. Draw the block diagram of an AFC circuit and its control action.
5. How the composite video signal is detected ? Explain.
6. What is range ambiguity ? Explain.
7. What is a pulse Doppler RADAR ?
8. What are the factors that influences the tracking error ?
9. Explain the working of a non-coherent MTI radar.
10. State the characteristics of high p.r.f. pulse Doppler.

(8 × 5 = 40 marks)

Part B

11. (a) (i) Explain image continuity.

    (ii) Explain interlaced scanning.

    Or

    (b) With block diagram, explain the operation of a TV transmitter and TV receiver.

12. (a) (i) Explain three colour theory.

    (ii) Explain the operation of a automatic degaussing circuit.

    Or

    (b) (i) Explain the principle of SECAM standard.

    (ii) With block diagram explain the digital TV transmitter.

Turn over

13. (a) With block diagram, explain the operation of a RADAR system.

Or

(b) Derive the RADAR range equation.

14. (a) Explain :

(i) CW altimeter.

(ii) Multiple frequency CW RADAR.

Or

(b) Explain :

(i) Blind speed.

(ii) Tracking RADAR.

(4 × 15 = 60 marks)

C 83785

Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) [SUPPLEMENTARY] EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC 14 704 (A)—INTERNET TECHNOLOGY

Time : Three Hours

Maximum : 100 Marks

Answer any **eight** *questions.*

1. Explain about TCP services.
2. What is web cache ? State its advantages.
3. Compare SMTP and HTTP.
4. Explain about Audio compression in the Internet.
5. Explain the audio/video streaming architecture.
6. Explain the leader fields of MIME.
7. Explain the features of Oakley.
8. Explain the term SSL connection and SSL session.
9. Comment on the characteristics of WAP forum solutions.
10. What are the advantages of Indirect TCP ?

(8 × 5 = 40 marks)

Part B

11. Discuss in detail about HTTP.

Or

12. With an example show how client/server communication is carried out using socket with TCP and VDP.
13. Discuss briefly any three scheduling policy methods.

Or

14. Explain about RTSP and integrated services.
15. Explain about IP security architecture.

Or

16. Describe in detail about SSL.
17. Discuss the goals requirements and optimization of mobile IP.

Or

18. Write a brief note on Adhoc networks and WML.

(4 × 15 = 60 marks)

C 83784 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) [SUPPLEMENTARY] EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC 14 703—DIGITAL SYSTEM DESIGN

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

1. What are the primary design units of a VHDL code ? Explain.
2. What are the data types supported by VHDL ? Explain.
3. With suitable examples, explain signal assignment and variable assignment statements.
4. Explain state assignment rules with suitable examples.
5. Design a 3 × 3 binary multiplier.
6. What are cycles and races in asynchronous sequential circuits ?
7. Explain the difference between PROM, PLA and PAL.
8. With schematic of one segment of the architecture, explain the difference between PAL 14L4 and PAL 12H6 devices.
9. Explain Fault redundancy.
10. With neat sketch, explain the boundary scan architecture.

(8 × 5 = 40 marks)

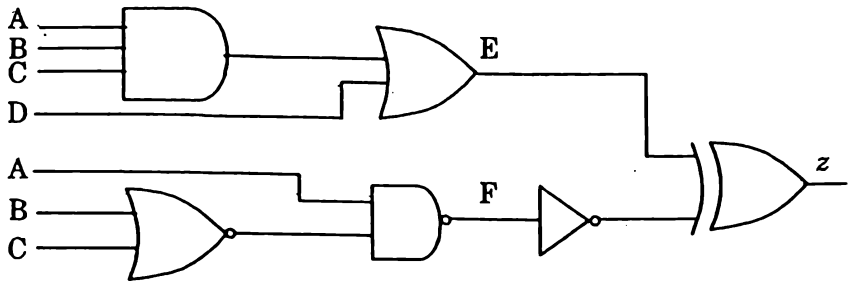
Part B

11. (a) (i) Write the behavioral description of a D-flip flop in VHDL. (5 marks)

(ii) Explain the various delays supported by VHDL. (10 marks)

Or

(b) What are concurrent signal assignment statements ? Write a VHDL description of the following combinational network (on Page 2) using concurrent statements. Each gate has a 5-ns delay, excluding the inverter, which has a 2-ns delay :



12. (a) Reduce the following state table using implication method :

Present State	Next State		Present Output	
	X = 0	1	X = 0	1
a	c	f	0	0
b	d	e	0	0
c	h	g	0	0
d	b	g	0	0
e	e	b	0	1
f	f	a	0	1
g	c	g	0	1
h	c	f	0	0

Or

(b) (i) Design a Moore based sequential network for detecting the sequence 1010.

(7 marks)

(ii) Explain race free state assignment in asynchronous sequential circuits with suitable example.

(8 marks)

13. (a) Explain the 22V10 sequential PLD architecture.

Or

(b) Explain the FLEX 10K device architecture.

14. (a) Explain D-algorithm and Boolean difference algorithm for test generation.

Or

(b) Explain Built-In Self-Test (BIST) methodology and its test pattern generation techniques.

(4 × 15 = 60 marks)

C 83783 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) [SUPPLEMENTARY] EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC 14 702—MICROWAVE ENGINEERING

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

1. What is a T-junction power divider ? Give some commonly used T-junction power dividers.
2. Explain the principle of working of a circulator.
3. State and explain the principle of working of an Cyclotron.
4. What are millimeter wave tubes ? Explain.
5. What are the high frequency limitations of transistors ?
6. Explain the operation of a Varactor diode.
7. Explain Avalanche effect.
8. Explain the operation of PIN diode.
9. A coplanar strip line carries an average power of 250 mW and a peak current of 100 mA. Determine the characteristic impedance of the coplanar strip line.
10. What are composite filters ? Give its significant features.

(8 × 5 = 40 marks)

Part B

11. (a) Deduce the S matrix for a :

    (i) Three-port network.

    (ii) Four-port network.

Or

(b) (i) Design an equal-split Wilkinson power divider for a 50 Ω system impedance at frequency f_0.

(5 marks)

(ii) Design a Bethe hole coupler (with parallel guides) for X-band wave guide operating at 9 GHz, with a coupling of 20 dB. Calculate the coupling and directivity from 7 to 11 GHz. Assume a round aperture.

(10 marks)

Turn over

12. (a) Explain the principle of operation and bunching process of a two-cavity Klystron. Derive an expression for its optimum bunching distance L_{opt}.

Or

(b) A travelling wave tube operates under the following parameters :

Beam voltage	=	3 kV
Beam current	=	30 mA
Characteristic impedance of helix	=	10 Ω
Circuit length	=	50
Frequency	=	10 GHz

Calculate :

(i) Gain parameter.

(ii) Output power gain in dB.

(iii) Four propagation constants.

13. (a) (i) Explain the construction and working of a Schottky Barrier diode. (9 marks)

(ii) Compare TRAPATT and BARITT diode. (6 marks)

Or

(b) An IMPATT diode has the following parameters :

Carrier drift velocity	=	2×10^7 cm/s
Drift region length	=	6 μm
Maximum operating voltage	=	100 V
Maximum operating current	=	200 mA
Efficiency	=	15%
Breakdown voltage	=	90 Volts

Calculate :

(i) Maximum CW output power in Watts.

(ii) Resonant frequency in Hz.

(15 marks)

14. (a) Explain the following planar transmission-line structures :

(i) Couplet microstrip line. (3 marks)

(ii) Coplanar transmission line. (3 marks)

(iii) Coplanar transmission line. (3 marks)

(iv) Slot line. (6 marks)

Or

(b) Design a three-section half-wave band-pass filter with a center frequency of 10 GHz, a bandwidth of 1 GHz and a passband tolerance $K^2 = 0.1$ which gives a maximum VSWR equal to 1.863.

[4 × 15 = 60 marks]

C 83782 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electronics and Communication Engineering

EC 14 701—INFORMATION THEORY AND CODING

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Define self information, entropy and mutual information.
2. What is source coding ? Explain the need for source coding. What is the need for the source coders to satisfy prefix property.
3. Define a binary symmetric channel. Find the source and receiver entropies of such a channel.
4. Discuss the construction of Galois field.
5. Show that Linear block codes are groups.
6. Explain the properties of cyclic code.
7. Write notes on binary and non-binary BCH codes.
8. Find the generator polynomials of a (7, 4) cyclic code.
9. Discuss the distance properties of convolutional codes.
10. Define the terms :

    Rate efficiency, Constraint length, Hamming distance and Hamming weight.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. (a) State and prove channel coding theorem.

Or

(b) Encode the following source using Huffman encoding procedure and Shannon fano encoding procedure. Find the efficiency of coding.

Turn over

12. (a) (i) Explain an encoding and a decoding procedure to generate linear block codes.

(ii) Discuss the error detecting and correcting capabilities of Linear block codes.

Or

(b) Explain group and fields. Give two examples for each. Also discuss the properties of GF (2m).

13. (a) Explain a method each with an example (i) to find systematic and non-systematic cyclic codes (ii) to detect the error in a cyclic code.

Or

(b) Explain the method of coding and decoding Reed Solomon codes.

14. (a) Write notes on interleaved convolutional codes. Compare the performance of convolutional codes and interleaved convolutional codes.

Or

(b) Explain a method to decode a convolutionally coded word.

(4 × 15 = 60 marks)

C 83781 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 14 705 F—SATELLITE COMMUNICATION

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Justify why the orbit is called as orbital Keplerian element ?
2. Differentiate between Apogee and Perigee.
3. Illustrate the effects of non-spherical earth.
4. Why a propulsion subsystem is required for a satellite ?
5. Summarize the features of spot beam antenna.
6. Formulate uplink and downlink equation of a satellite.
7. State the different transmission losses during the transmission link.
8. Compare and Contrast between preassigned and demand assigned traffic ?
9. Show the operation of FDMA and list how this differs from FDM.
10. When VSAT type terminals involved CDMA offers several advantages of satellite networking. What are they ?

(8 × 5 = 40 marks)

Part B

Answer any **four** *questions.*
Each question carries 15 *marks.*

11. (a) i) Derive the suitable equations for look angles and the range for geostationary satellite. (8 marks)

ii) List and explain any *one* type of launching procedures of satellite. (7 marks)

Or

Turn over

(b) i) Generate from basic principles the orbital velocity of a satellite. (10 marks)

ii) Define the term angle of tilt and explain how the polar mount antenna works ? (5 marks)

12. (a) i) Examine the system reliability and design life time of the space segment. (7 marks)

ii) Discuss in detail about the communication payload and supporting subsystems. (8 marks)

Or

(b) i) Explain the necessity of power amplifier in the transponder. (8 marks)

ii) Outline the factors that contributing to noise in an earth station receiving channel. (7 marks)

13 (a) i) Summarize the sources of noise in satellite communication. What is the importance of noise temperature in link design ? (8 marks)

ii) Outline, why cassegrain antennas are popular for large earth stations ? (7 marks)

Or

(b) Review the concepts of VSAT system in detail with neat diagrams. (8 marks)

14. (a) i) Explain the TDMA frame format in detail with relevant diagrams. (8 marks)

ii) Outline the "frequency reuse" process and give the merits of spread spectrum communication. (7 marks)

Or

(b) Illustrate the features of various multiple access schemes deployed for satellite access and compare it. (15 marks)

[4 × 15 = 60 marks]

C 83780 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 14 705D—PROFESSIONAL ETHICS

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Demonstrate the significance of Self Interest.
2. Discuss the models of professional roles.
3. Describe few steps in confronting Moral Dilemma.
4. Classify the conflict of interest. Give example.
5. Differentiate between Risk analysis and Risk benefit Analysis.
6. Where is the use of knowledge of risk acceptance to engineer.
7. Generalize the term Professional obligations.
8. Differentiate Privacy and Anonymity.
9. Describe the importance of ethics in engineering.
10. Summarize the importance of caring.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. i) Describe about Consensus and Controversy.
    ii) Describe in detail about the concept of Moral Autonomy.

Or

12. i) Illustrate in details the various theories about right action.
    ii) Point out in details the various Ethical theories.
13. i) Define the term Risk and Safety. How we an engineer assess the safety ?
    ii) Explain three mile island case.

Or

Turn over

14. i) Explain the concept of Confidentiality in detail.

ii) List out the main elements of IPR. Give examples of Discrimination.

15. i) Describe the significance of the concept of Computer Ethics.

ii) Describe in detail about environmental ethics.

Or

16. i) Describe in details about the Global issue of Weapons development.

ii) Explain how engineers should act as managers and its importance.

17. i) Describe moral and values and their importance.

ii) Explain how self-respect and respect for others differ.

Or

18. i) Examine the importance of empathy.

ii) Explain character and its importance.

(4 × 15 = 60 marks)

C 83779 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 14 705 C—ELECTRIC POWER UTILISATION

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Draw the speed - Time curve of a traction system. Also explain various periods and the action.
2. Discuss short notes on Trolley bus.
3. With the aid of transmission of tractive effort, describe the mechanism of train movement.
4. Summarize basic principle of induction heating and also its applications.
5. Describe arc welding, also list its types.
6. Generalize the types of lighting system.
7. Discuss laws of illumination and its limitations in actual practice.
8. Explain the main faults of a lighting system and how these are overcome.
9. Compare and Contrast between Refrigeration and Air Conditioning.
10. State the advantages of multistage compressor.

(8 × 5 = 40 marks)

Part B

Answer any **four** *questions.*
Each question carries 15 *marks.*

11. (a) (i) Explain the recent trends in electric traction. (7 marks)

(ii) A sub urban electric train has a maximum speed of 65 kmph. The schedule speed including a station stop of 30 seconds is 43.5 kmph. If the acceleration is 1.3 kmphps ; Calculate the value of retardation when the distance between stops is 3 km.

(8 marks)

Or

(b) (i) Explain about the types of supply system used in traction system. (7 marks)

(ii) Describe clearly regenerative braking when used for D.C. series traction motors. Also discuss the requirements for ideal traction. (8 marks)

Turn over

12 (a) (i) Summarize technical note on welding transformer. (5 marks)

(ii) Discuss about the properties of heating elements. Explain about any two types of induction furnaces.

(10 marks)

Or

12. (b) (i) Explain the process of dielectric heating and derive the expression for total heat energy.

(10 marks)

(ii) Discuss the basics of Electrolysis. (5 marks)

13. (a) (i) State stroboscopic effect. Explain the working of fluorescent tube with neat connection diagram incorporating glow type starter.

(7 marks)

(ii) A classroom dimension 10 metre * 7.5 metre with a ceiling height of 4 metre is to be provided with general illumination of 300 lux. Considering a co-efficient of utilization is 0.5 and depreciation factor of 1.2. Calculate the number of 36 watts fluorescent lamps required. The luminous efficacy of 36 watts fluorescent lamp is 84 lumens per watt.

(8 marks)

Or

13. (b) (i) With a neat diagram explain the construction and working of sodium vapour lamp.

(7 marks)

(ii) Discuss the principle of street or road lighting. Explain different types of lighting with neat Sketches.

(8 marks)

14. (a) (i) Explain standard vapour compression refrigeration cycle with T-S and P-H diagram.

(5 marks)

(ii) A vapor compression machine is used to maintain a temperature of - 230C in refrigerated space. The ambient temperature is 370C. The compressor takes in dry saturated vapor of F-12. A minimum 100C temperature difference is required at the evaporator as well as condenser. There is no sub-cooling of liquid. If refrigerant flow is rate is 1 kg./min

Find : (i) Tonnage of refrigeration ; (ii) Power requirement ; and (iii) Ratio of COP of this cycle to COP of Carnot cycle.

(10 marks)

Or

14. (b) (i) Define Air-conditioning. Classify air-conditioning system Explain Central air conditioning system.

(7 marks)

(ii) State and explain various heat loads to be considered for cooling load calculations of a typical building.

(8 marks)

(4 × 15 = 60 marks)

C 83778 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 14 705 B—HIGH VOLTAGE ENGINEERING

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Explain the phenomena of electrical conduction in liquids.
2. Describe the current growth phenomenon in a gas subjected to uniform electric fields.
3. State and explain the break down in uniform fields.
4. Explain simple voltage doubler used for generation of high D.C. voltages.
5. How are rectangular current pulses generated for testing purposes ? How is their time duration controlled ?
6. Trigatron gap- Explain its functions and operation.
7. Explain the Hall generator for measuring high d.c. current.
8. Discuss the factors affecting discharge detection.
9. Describe the measurement methods of radio interference.
10. Write short notes on protection against surges.

(8 × 5 = 40 marks)

Part B

Answer any **four** *questions.*
Each question carries 15 *marks.*

11. (a) (i) Explain clearly various processes which explain electric breakdown in vacuum. (10 marks)

(ii) State the factors which affect breakdown of gaseous dielectrics. (5 marks)

Or

Turn over

(b) (i) Describe the Paschen's law and its significance. (10 marks)

(ii) Explore the concept of penning effect. (5 marks)

12. (a) (i) With a neat sketch explain the Cockcroft - Walton voltage multiplier circuit for generation of high DC voltages. (10 marks)

(ii) State the components of multistage impulse generator ? (5 marks)

Or

(b) (i) Give different circuits that produce impulse waves explaining clearly their relative merits and demerits. (10 marks)

(ii) Mention the necessity of generating High D.C. voltage. (5 marks)

13. (a) (i) Explain the method of measuring high voltage D.C. using series resistance micro ammeter and hence its limitations. (10 marks)

(ii) How stray effect is reduced in shunt type of measurement ? (5 marks)

Or

(b) (i) Describe chubb and Forfesque method of measuring high A.C. peak voltages. (10 marks)

(ii) Give the procedure for D.C. and A.C. peak voltage measurements using sphere gap.

14. (a) (i) Describe the Schering bridge method of determining the capacitance and loss angle of a dielectric specimen. Derive the relevant formula. (10 marks)

(ii) How dielectric loss is measured. (5 marks)

Or

(b) (i) Develop wave equation of travelling waves in transmission line and also discuss the behavior of travelling waves in open circuited transmission lines. (10 marks)

(ii) Write short notes on lightening phenomenon. (5 marks)

[4 × 15 = 60 marks]

C 83776 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 14 704 (D)—MECHATRONICS

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Brief evolution of Mechatronics.
2. Describe about point to point and contouring systems.
3. Explain design consideration of NC machine tools.
4. Stepper motor is an open loop control. Justify.
5. Generalize the applications of AC and DC motors.
6. What is meant by point to point programming ?
7. Write any 2 examples of part programming.
8. Write short notes on contact and non-contact sensors.
9. Explain forward transformation and reverse transformation of robot manipulator with 2 degrees of freedom.
10. Briefly explain the Robot Programming Languages in detail.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. a) Explain open loop and closed loop control system with neat sketches.

Or

b) Describe the methods of improving machine accuracy and productivity.

12. a) i) Explain the working principle of hydraulic systems. (10 marks)

ii) Explain the specifications of stepper motor. Explain it briefly. (5 marks)

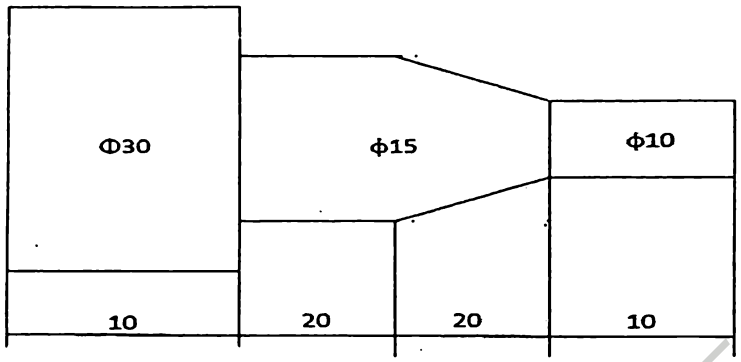
Or

Turn over

b) i) Design a 3bit synchronous counter. (10 marks)

ii) Write short notes on linear and circular interpolators. (5 marks)

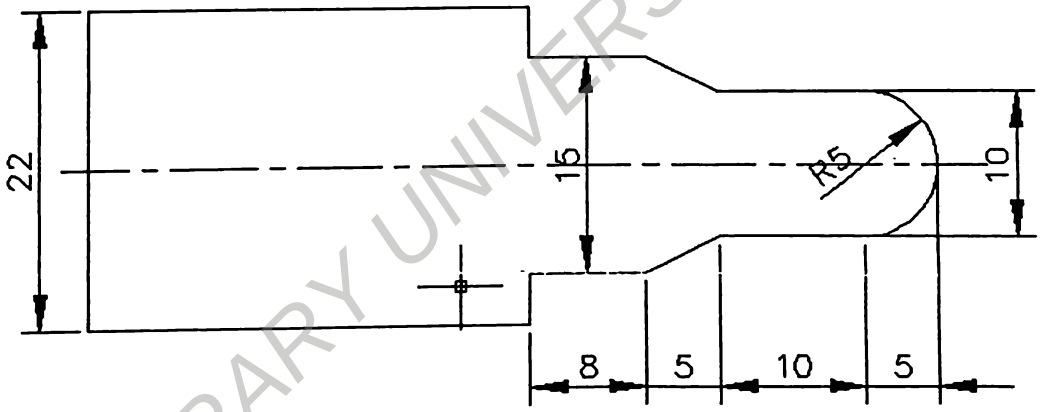
13. a) Write complete CNC part program for the component shown in below figure.



ALL DIMENSIONS ARE IN MM

Or

b) Write a CNC part program for the below figure. Assume spindle speed and feed. Use standard ISO G and M codes.



14. a) Classify the robots according to the co-ordinates of motion. With a sketch and example, explain the features of each type.

Or

b) i) Write down the capabilities and limitations of Lead through methods. (8 marks)

ii) Compare and Contrast online and offline programming. (7 marks)

[4 × 15 = 60 marks]

C 83775 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 14 704 (B)—ELECTRICAL MACHINE DESIGN

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Calculate the apparent flux density at a particular section of the tooth from the following. Slot width = 10 mm, tooth width = 12 mm, gross core length =.32 m, Stacking factor = 0.9, real flux density at the root of the teeth = 2.25 tesla, Permeability = 31.4×10^{-6} H/m.
2. Discuss in detail the choice of specific electrical and magnetic loadings of D.C. machines.
3. Explain how to select the number of poles for a D.C. machine.
4. Differentiate Core and shell type transformers.
5. Express the overall dimensions of a single-phase transformer.
6. Derive the voltage per turn equation for a single-phase transformer.
7. Compare salient pole alternators and turbo alternators.
8. Explain the design strategy of damper windings.
9. Derive the output equation of Induction machine.
10. What are the different types of stator slots and discuss the advantages and disadvantages of selecting higher number of slots ?

($8 \times 5 = 40$ marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. a) Calculate the armature diameter and core length for a 7.5 kW, 4 pole, 1000 r.p.m., and 220 V shunt motor. Assume : Full load efficiency = 0.83, field current is 2.5% of rated current. The maximum efficiency occurs at full-load.

Or

Turn over

b) Determine the main dimensions, number of poles, number of conductors per slot and air gap length subjecting the results to design checks for a 600 kW, 500 V 900 r.p.m. d.c. generator. Assume : Average flux density 0.6T, ampere-conductors per metre 35000. The ratio pole arc to pole pitch 0.67, efficiency 91%. Peripheral velocity should not exceed 40m/s Armature m.m.f. per pole should be below 7500A,Current per brush arm should not exceed 400A peripheral velocity should not exceed 40m/s Armature m.m.f. per pole should be below 7500A.

(15 marks)

12. a) A 3-phase, 50 Hz, Oil cooled core type transformer has the following dimensions. Distance between the core centres = 0.2 m, Height of the window = 0.24 m, Diameter of circumscribing circle = 0.14m,The flux density in core = 1.25Wb/m^2,the current density in the conductor = 2.5A/mm^2. Assume the window space factor of 0.2 and the core area factor = 0.56.The core area is 2 stepped. Estimate the kVA rating of the transformer.

(15 marks)

Or

b) The tank of 1250 kVA, Natural oil cooled transformer has the dimensions length, width and height as 0.65 × 1.55 × 1.85 m respectively. The full load loss = 13.1 kW. Loss dissipation due to radiations = 6 W/m^2-C degree, Loss dissipation due to convection = 6.5 W/m^2-C degree. Improvement in convection due to provision of tubes = 40%, temperature rise = 40 °C Length of each tube = 1 m, Diameter of tube = 50 mm. Find the number of tubes for this transformer.

(15 marks)

13. a) Design the rotor of a 3-phase 20 MVA, 11 kV, 3000 r.p.m., 50 Hz, turbo alternator with the following design data. Diameter at the air gap = 0.8 m, Gross length = 2.4 m, stator turns per phase = 18, Number of stator slots = 36, Exciter voltage = 220 volts, Estimate (i) Number of rotor slots ; (ii) area of the field conductor ; (iii) Turns in the field coil ; and (iv) Field current.

(15 marks)

Or

b) Design the field coil of a 500 r.p.m., 3-phase, 50 Hz alternator having the following design data. Diameter of stator = 95 cm, Core length = 30 cm, Pole body =10 cm × 30 cm, Field ampere turns = 6000, Excitation voltage = 80 volts. Heat dissipation from the outer surface = 0.35 watts/ cm^2. Assume missing data suitably.

(15 marks)

14. a) A 15 kW 440 volts, 4 pole, 50 Hz, 3-phase induction motor is built with a stator bore of 0.25 m and a core length of 0.16 m. The specific electric loading is 23000 ac/m. Using data of this machine determine the core dimensions, number of slots and number of stator conductors for a 11 kW, 460 volts, 6 pole, 50 Hz motor. Assume full load efficiency of 84 % and power factor of 0.82. The winding factor is 0.955.

(15 marks)

Or

b) A 3-phase 3000 volts 260 kW, 50 Hz, 10 pole squirrel cage induction motor gave the following results during preliminary design. Internal diameter of the stator = 75 cm, Gross length of the stator = 35 cm, Number of stator slots = 120, Number of conductor per slot = 10. Based on the above data calculate the following for the squirrel cage rotor, (i) Total losses in rotor bars ; (ii) Losses in end rings ; (iii) Equivalent resistance of the rotor.

(15 marks)

[4 × 15 = 60 marks]

C 83774 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 14 704A—SWITCHED MODE POWER CONVERTERS

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Compare isolated and non-isolated dc-dc converters.
2. What is the principle of voltage control in the basic DC-DC switching converter ?
3. Discuss the advantages of isolated dc-dc converters.
4. Explain the drawback of linear power supplies.
5. What is a power conditioner ? Mention its applications.
6. Describe over modulation in PWM switching.
7. Enumerate the effect of blanking time on voltage in PWM inverters.
8. Explain a method of voltage control within the Inverter.
9. Compare series and parallel resonant circuits.
10. Explain the resonant switch converters.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. (a) i) A buck -boost regulator has an input voltage of 12V.The duty cycle is 0.6 and the switching frequency is 25kHz.For an Inductance of 250 μ H and for a filter capacitance of 220 μ F the average load current is 1.5A.determine : a) Average output voltage b) peak to peak ripple voltage c) peak to peak ripple current of an inductor d) peak current of transistor.

(10 marks)

ii) Explain the operation of full-bridge dc-dc converter. (5 marks)

Or

Turn over

(b) i) Compare different types of dc-dc converters. (5 marks)

ii) Design a Buck-Boost converter circuit having parameters, input voltage = 24 V, D = 0.4, load resistance = 5 ohm, L = 20 micro H, C = 80 micro F. Determine the output voltage, average inductor current, Maximum and minimum value of inductor current and the output voltage ripple. Assume a switching frequency of 100 kHz. (10 marks)

12. (a) With circuit diagram and waveforms, explain the principle of operation of a push pull converter. Derive expressions for duty ratio, peak current through the switch and peak voltage across the switch.

(15 marks)

Or

(b) i) Explain the working of double ended fly back converter with neat diagram and waveforms.

(9 marks)

ii) Compare basic forward converter and practical forward converter. (6 marks)

13. (a) With the help of neat diagram and waveforms explain the three phase voltage source inverter operation using space vector modulation.

(15 marks)

Or

(b) Explain in detail about the square and sine wave switching schemes used in inverter.

(15 marks)

14 (a) i) With the help of neat circuit diagram and relevant waveforms, discuss the operation of parallel loaded resonant dc-dc converter in discontinuous current conduction mode.

(12 marks)

ii) State the advantages and limitations of ZVS converters. (3 marks)

Or

(b) Discuss the operation of ZCS resonant switch converters. Draw the circuit diagram and relevant waveforms.

(15 marks)

[4 × 15 = 60 marks]

C 83773 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 14 703—ELECTRIC DRIVES

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. List and Discuss the classification of electric drives.
2. Illustrate the choice of selection of the motor for different loads.
3. Explain the four quadrant operation of an electric drive.
4. Draw and explain the torque- speed Characteristics for the D.C. motors.
5. Show a semi converter fed D.C. drive operated in quadrant IV ? Justify your answer.
6. Discuss the different control techniques of chopper in detail
7. Explain the term Plugging in three phase induction motor.
8. Compare static Krammer and Scherbius system.
9. Explain the modes of adjustable frequency control in synchronous motor drives.
10. Draw and explain a Bipolar drive circuit of variable reluctance motor ?

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. (a) (i) Compare various power electronic converters used in the drives. (7 marks)

(ii) Explain in detail about the multi quadrant dynamics of electrical drives. (8 marks)

Or

(b) Compose the mathematical condition to obtain steady state stability of equilibrium point. (15 marks)

Turn over

12. (a) Describe the steady state analysis of the single phase fully controlled converter fed separately excited DC motor drive for continuous and discontinuous conduction mode. (15 marks)

Or

(b) (i) Discuss the four quadrant operation of DC-DC converter. (8 marks)

(ii) Solve a 220 V, 20 A, 1000 r.p.m. separately excited de motor has an armature resistance of 2.5 Ω. The motor is controlled by a step-down chopper with a frequency of 1 kHz. The input dc voltage to the chopper is 250 V. Identify what will be the duty cycle of the chopper for the motor to operate at a speed of 600 rpm delivering the rated torque. (7 marks)

13. (a) Discuss in detail with suitable diagrams and waveforms the v/f control technique of speed control method of induction motor. (15 marks)

Or

(b) (i) Explain the operation of constant slip speed control. (7 marks)

(ii) Why the power factor of the slip power recovery scheme of Speed control of induction motor is low ? (8 marks)

14. (a) (i) Explain self control of synchronous motor drive in detail. (10 marks)

(ii) Explain commutator less D.C. motor. (5 marks)

Or

(b) (i) Draw and Explain the construction of Switched reluctance motor. (8 marks)

(ii) Describe the closed loop control operation of switched reluctance motor. (7 marks)

[4 × 15 = 60 marks]

C 83772 (Pages : 4) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 14 702—MODERN CONTROL THEORY

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

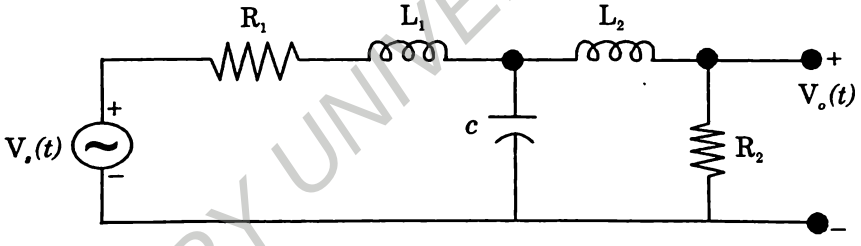
1. List out least one advantage and one disadvantages of selecting :

   (i) Physical variable.

   (ii) Phase variable.

   (iii) Canonical variables for state-space formulation of control systems.

2. Obtain the state model in physical variable form for the circuit shown in Figure below.



3. Construct a state model for a system characterized by a differential equation :

   $\dddot{y} + 6\ddot{y} + 11\dot{y} + 6y = \ddot{u} + 8\dot{u} + 17\dot{u} + 8u.$

4. What is a Non-linear system ? What are the different types of Non-linearities ? Explain each of them in detail.

5. Derive the describing function of Dead-zone and saturation Non-linearity.

6. Briefly explain the concept of equilibrium points and the stability definitions.

Turn over

7. Explain the term-Linear quadratic regulator.

8. State and prove the Liapunov's stability theorem for linear time invariant systems.

9. Explain the method of control system design by pole placement.

10. What are state observes ? Explain. Sketch the block diagram of fall order state obscener.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*

Each question carries 15 *marks.*

1. (a) Represent the following systems in state space :

(i) Phase variable form : $\frac{Y(s)}{u(s)} = \frac{4s^3 + 3s^2 + 2s + 5}{6s^4 + 11s^3 + 5s^2 + 6x + 5}$. (8 marks)

(ii) Jordan canonical form : $G(s) = \frac{(s+2)}{(s+5)^2 (s+7)^2}$ and obtain their state diagram for both forms. (7 marks)

Or

(b) (i) A system is described by the following differential equation. Represent the system in state space :

$\frac{d^3x}{dt^3} + 3\frac{d^2x}{dt^2} + 4\frac{dx}{dt} + 4x = u_1(t) + 3u_2(t) + 4u_3(t)$ the outputs are :

$y_1 = 4\frac{dx}{dt} + 3u_1 \; ; \; y_2 = \frac{d^2x}{dt^2} + 4u_2 + u_3$. (8 marks)

(ii) Determine the transfer function for the system given below :

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 1 & -2 \\ 4 & -5 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 2 \\ 1 \end{bmatrix} u \quad y = [1, 1] \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}.$$ (7 marks)

2. (a) (i) What are the characteristics of non-linear systems ?

(ii) Explain the following types of non-linearities :

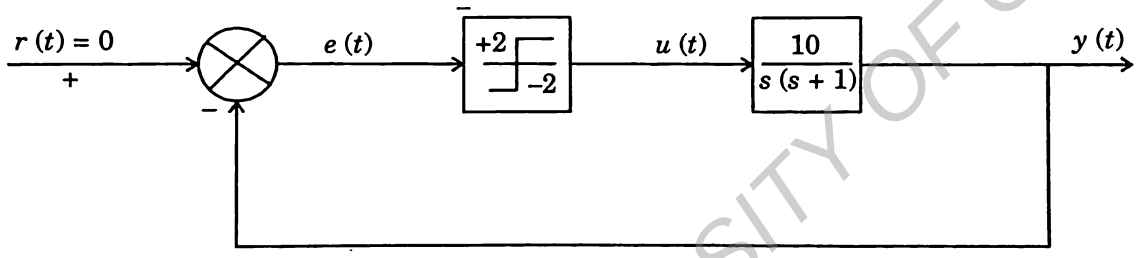
(i) Back lash ; (ii) Dead zone ; (iii) Saturation.

(iii) What is a controller ? What are the various types of controllers ? Explain briefly.

(15 marks)

Or

(b) (i) Construct the phase trajectory of the following system by using the method of isoclines shown in figure.



(8 marks)

(ii) What is a singular point ? Draw the phase trajectory of the following singular points :

(i) Stable node.

(ii) Unstable node.

(iii) Saddle point.

(iv) Vortex point. (7 marks)

3. (a) (i) Explain Krasovskii's method of construction of Liapunov function for non-linear systems.

(8 marks)

(ii) Explain Liapunov's theorems on :

(i) Stability.

(ii) Asymptotic stability.

(iii) Instability. (7 marks)

Or

Turn over

(b) (i) State the Lyapunov theorems. (5 marks)

(ii) Consider a non-linear system described by the equations :

$$\dot{x}_1 = -3x_1 + x_2$$
$$\dot{x}_2 = -x_1 - x_2 - x_2^3.$$

By using the Krasoviskii method, investigate the stability of the system. (10 marks)

4. (a) A single input system is given by the following state equation :

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \\ \dot{x}_3 \end{bmatrix} = \begin{bmatrix} -1 & 0 & 0 \\ 1 & -2 & 0 \\ 2 & 1 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} 10 \\ 1 \\ 0 \end{bmatrix} u.$$

Design a state feedback controller which will give closed-loop poles at $-1 \pm j2, -6$. Determine the state feedback gain matrix by anyone method.

Or

(b) (i) Check for sign definiteness of the following quadratic forms :

(1) $v(x) = -2x_1^2 - 2x_2^2 - 4x_3^2 - 2x_1x_2 + 4x_2x_3 + 4x_1x_3$

(2) $v(x) = -2x_1^2 - x_2^2 - 4x_3^2 - 2x_1x_2 + 2x_2x_3 + 4x_3x_1.$

(7 marks)

(ii) Write short notes on :

1) Pontrygin's Minimum Principle.

2) Transversality condition.

(8 marks)

[4 × 15 = 60 marks]

C 83771 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

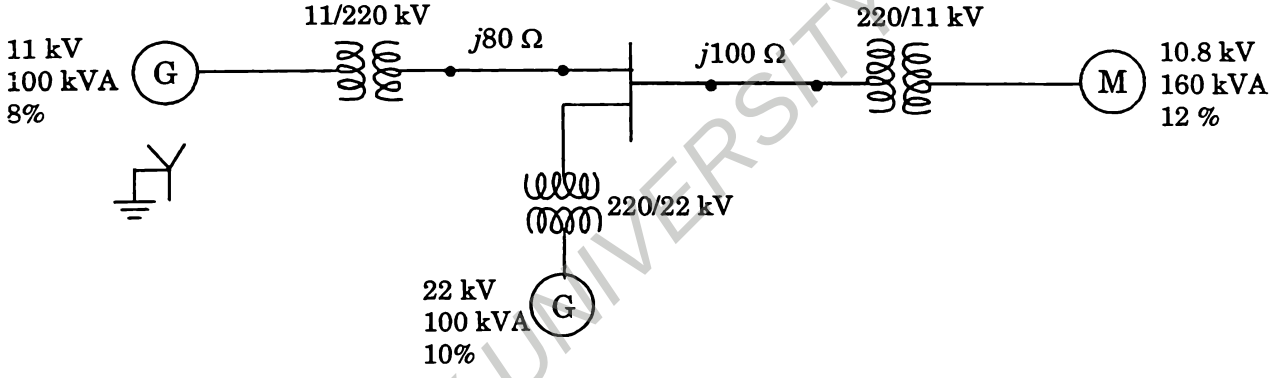
EE 14 701—POWER SYSTEM ANALYSIS

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Write down advantages of per-unit Computation.
2. Draw the single line diagram showing the essential parts in the power system network :



3. What is Jacobian matrix ? How the elements of Jacobian matrix are computed ?
4. Explain about the economic load dispatch control.
5. Discuss the loss formula co-efficients.
6. Compare types of shunt and series faults.
7. Describe the methods of reducing short circuit current.
8. Draw the equivalent sequence network diagram for a single-phase to ground fault in a power system and explain.

Turn over

9. Write the power-angle equation of a synchronous machine connected to an infinite bus and also discuss when maximum power transferable to the bus.

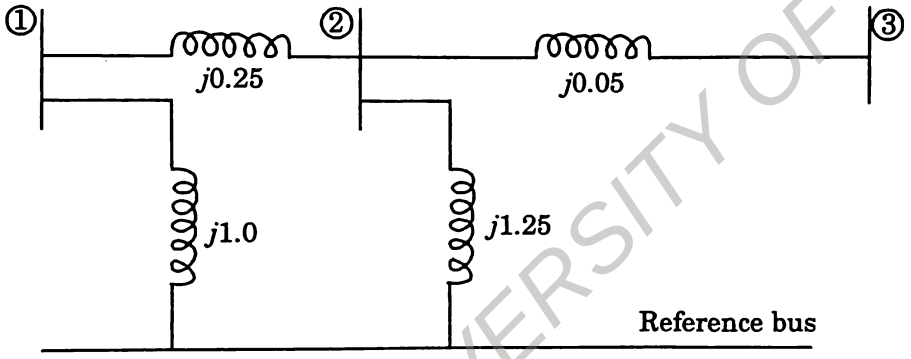
10. Explain two methods of improving the transient stability limit of power system.

(8 × 5 = 40 marks)

Part B

Answer any **four** *questions.*
Each question carries 15 *marks.*

11. (a) Find the bus impedance matrix for the system whose reactance diagram is shown in fig. All the impedances are in p.u.



(15 marks)

Or

(b) Explain the modeling of generator, load, transmission line and transformer for power flow, short circuit and stability studies.

(15 marks)

12. (a) (i) Determine the daily water used by hydro plant and daily operating cost of thermal plant with the load connected for total 24 hrs. from the given data :

The load connected, P_D = 400 MW

Generation of thermal plant, P_{GT} = 200 MW

Generation of hydro plant, P_{GH} = 300 MW.

(7 marks)

(ii) Write down the advantages of operation of hydrothermal combinations.

(8 marks)

Or

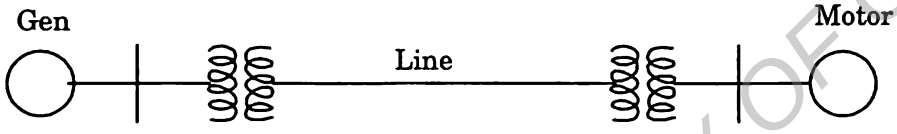
(b) (i) Draw the block diagram of load frequency control in two-area control system and explain.

(8 marks)

(ii) Derive the model of a speed governing system and represent it by a block diagram.

(7 marks)

13. (a) A synchronous generator and a synchronous motor each rated 25 MVA, 11 kV having 15 % sub-transient reactance are connected through transformers and a line as shown in fig. The transformers are rated 25 MVA, 11/66 KV and 66/11 kV with leakage reactance of 10% each. The line has a reactance of 10% on a base of 25 MVA, 66 kV. The motor is drawing 15 MW at 0.5 power factor leading and a terminal voltage of 10.6 kV. When a symmetrical 3-phase fault occurs at the motor terminals. Find the sub-transient current in the generator, motor and fault.



(15 marks)

Or

(b) Derive the expression for fault current in double line to ground fault on unloaded generator. Draw an equivalent network showing the inter connection of networks to simulate double line to ground fault.

14. (a) Describe the equal area criterion for transient stability analysis of a system.

Or

(b) Explain the modified Euler method of analyzing multi-machine power system for stability with a neat flow chart.

(15 marks)

[4 × 15 = 60 marks]

C 83770 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Mechanical Engineering

ME 14 705G—ENTREPRENEURSHIP

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. What do you understand by entrepreneurial competency ? Can they be acquired ?
2. "Entrepreneurs are made not born". Comment.
3. Write short notes on entrepreneurial competencies.
4. Briefly explain the various details which should be included in a project report.
5. How do you identify and evaluate business opportunities ?
6. Differentiate market survey and market assessment.
7. Define the term international entrepreneurship.
8. Briefly discuss how brainstorming helps in creativity.
9. Write a short note on technology transfer.
10. What are the stages in venture capital financing ?

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. a) Describe the salient characteristics of successful entrepreneurs with examples.

Or

b) Justify the need of entrepreneurs in economic development of a country like India.

12. a) Explain in detail about different types of feasibility study.

Or

b) Discuss in detail about assessment of risk in the industries.

Turn over

13. a) Explain the various stages of small business growth.

Or

b) Describe the concept of innovation. How innovation is different from creativity ?

14. a) Explain the importance of working capital for successful functioning of a small scale unit. What are the major determinants of working capital requirements of a small scale unit ?

Or

b) With neat sketch, discuss in detail about break even analysis.

(4 × 15 = 60 marks)

C 83769 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Mechanical Engineering

ME 14 705F—COMPOSITE MATERIALS

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. What are the types of reinforcements ?
2. Describe about the major objectives for mechanical testing of composite materials.
3. Illustrate in detail about NDT methods for the inspection of composite material.
4. What are the thermoplastic matrix materials ? What are their key features ?
5. Describe about Buckypapers and narrate about how it is made.
6. What is losipescu shear test ?
7. Explain about resultant forces and moments acting on composite laminate.
8. Discuss about disadvantages of composite materials.
9. Classification the MMC and CMC based on matrix material.
10. What are the different types of glass fibres ? What are their key features ?

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. (a) Explain in detail about rule of mixture.

Or

(b) Explain in detail about stress-strain diagram of a composite material

Turn over

12. (a) Explain in detail about ultrasonic testing and different techniques used to measure damages in composite materials using ultrasonic testing.

Or

(b) Explicate in detail about any rail shear test in testing composite materials.

13. (a) Explain in detail about predicting longitudinal strength of unidirectional lamina.

Or

(b) Illustrate in detail about analysis of composite laminate.

14. (a) Explain various features for the following laminates :

(i) Cross-ply laminate.

(ii) Angle-ply laminate

(iii) Symmetric laminate.

Or

(b) Explain in detail about carbon-carbon composites(C/Cs). Also elaborate the applications and advantages of C/Cs.

(4 × 15 = 60 marks)

C 83768 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Mechanical Engineering

ME 14 705 (D)—DESIGN OF JIGS AND FIXTURES

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Brief the complete location of work piece whose configuration is formed by flat plane using six point location principle.
2. Show the functional use of adjustable support pin by neat sketch.
3. Describe the location method using nest or cavity location with aid of simple sketch.
4. Discuss the application of vacuum clamping.
5. Explain about the essential parts of standard strap clamp.
6. Describe the various elements of drilling jig.
7. Show the difference between template and plate drill jig by neat sketch.
8. Draw channel drill jig and state its limitations.
9. Describe the working of simple expanding mandrel.
10. Name the various parts of milling fixture. Also brief the function of setting block.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. (a) (i) Discuss in detail about V block locating method. (8 marks)

(ii) Explain the working of mechanical equalizing jacks. (7 marks)

Or

(b) Enumerate the application of spherical, diamond pin and conical locators by neat sketches.

Turn over

12. (a) Explain the working of following clamps with neat sketches :

(i) Screw clamp ; (ii) Toggle clamp ; and (iii) Cam clamps.

Or

(b) With aid of simple sketch, discuss the working of air to hydraulic booster power operated clamps. Also, list out the advantages of power operated clamps.

13. (a) Show the constructional features of box drill jig and leaf drill jig by neat sketches.

Or

(b) Draw the drill jig to drill 4 holes of diameter 12 mm in the boss as shown in Fig. 1.

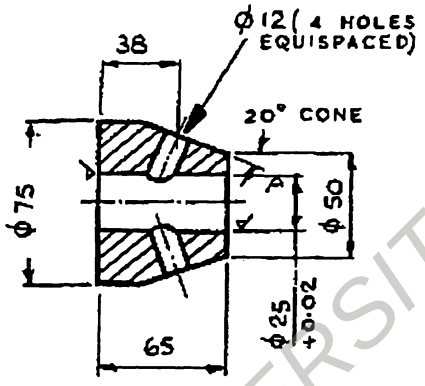


Fig.1

14. (a) Sketch and discuss the various elements of slot milling fixture for the component shown in Fig.2.

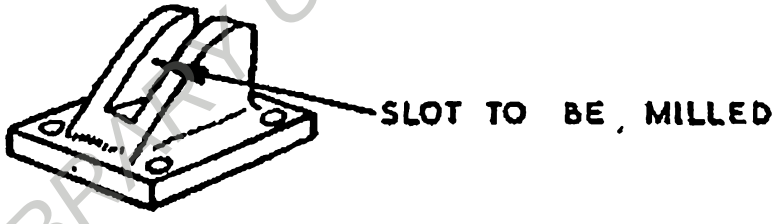


Fig.2

Or

(b) (i) Explain the construction and various parts of face plate fixture used for in line boring operation. (10 marks)

(ii) Write short notes on modular fixtures. (5 marks)

[4 × 15 = 60 marks]

C 83767 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Mechanical Engineering

ME 14 705 A—LOGISTICS AND SUPPLY CHAIN MANAGEMENT

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Consider the purchase of a bottled vegetable oil at a retail store. Describe the various stages in the supply chain and the different flows involved.
2. Mention the merits and demerits of water and rail transportation.
3. Discuss about the supply chain macro process in a firm.
4. What revenue management opportunities are available to a manufacturer ? How can it take advantage of these opportunities ?
5. List four functions of inventory.
6. Discuss the differences between supply chain and supply chain management.
7. List five categories of stocks.
8. What are the activities performed at operational level in logistics ?
9. Discuss about the role of transportation in supply chain.
10. Describe trade-offs that must be considered when making revenue management decisions.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. (a) Explain in detail about the three basic steps in achieving the strategic fit.

Or

(b) Explain in detail about the decision phases in a supply chain.

Turn over

12. (a) AV City stocks and sells a particular brand of laptop. It costs the firm Rs. 625 each time it places an order with the manufacturer for the laptops. The cost of carrying one laptop in inventory for a year is Rs. 130. The store manager estimates that total annual demand for the laptops will be 1500 units, with a constant demand rate throughout the year. Orders are received within minutes after placement from a local warehouse maintained by the manufacturer. The store policy is never to have stock outs of the laptops. The store is open for business every day of the year except Christmas Day. Determine the following:

    a) Optimal order quantity per order.

    b) Minimum total annual inventory costs.

    c) The number of orders per year.

    d) The time between orders (in working days).

Or

(b) The Food Place Supermarket stocks Munchkin Cookies. Demand for Munchkins is 5000 boxes per year (365 days). It costs the store Rs 80 per order of Munchkins, and it costs Rs. 0.50 per box per year to keep the cookies in stock. Once an order for Munchkins is placed, it takes four days to receive the order from a food distributor. Determine the following :

    a) Optimal order size.

    b) Minimum total annual inventory cost.

    c) Reorder point.

13. (a) Describe in detail about the role of IT in supply chain.

Or

(b) Explicate in detail about role of sourcing and effective sourcing decisions in a supply chain.

14. (a) Explain in detail about factors influencing distribution network design.

Or

(b) Explain in detail about trade-offs in transportation design.

(4 × 15 = 60 marks)

C 83766 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Mechanical Engineering

ME 14 704 (G)—FINITE ELEMENT METHODS

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. List the properties of stiffness matrix.
2. What is shape function ? What are its characteristics ?
3. What is the stiffness matrix for torsion and laminar pipe flow analogous problems in one dimension ?
4. What do you mean by local and global co-ordinates ?
5. Illustrate with any two node numbering schemes to exploit matrix sparsity and conservation of computer memory.
6. Explain the principle of stationary potential energy.
7. What do you mean by essential and non-essential boundary conditions ?
8. Write short notes on Axisymmetric problems.
9. What is the purpose of Isoparametric elements ?
10. Write down the Gaussian quadrature expression for numerical integration.

(8 × 5 = 40 marks)

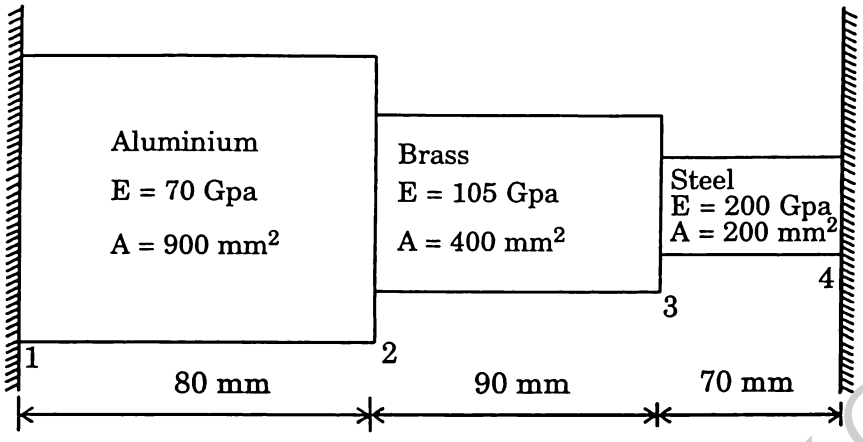
Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. (a) Describe in detail the general steps followed in the process of finite element analysis.

Or

(b) For the three stepped bar as shown, the bars fit snugly between the rigid walls at room temperature. The temperature is then raised by 40°C. Determine the displacements at 2 and 3, and stresses in the three sections :



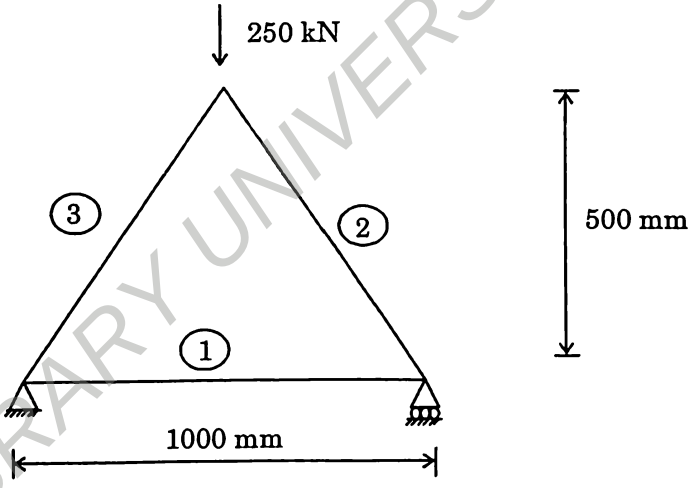
$\alpha_{Al} = 23 \times 10^{-6}$ /°C

$\alpha_{Brass} = 19 \times 10^{-6}$ /°C

$\alpha_{steel} = 12 \times 10^{-6}$ /°C

12. (a) Compute the nodal displacements and stresses in each member of the given three bar truss. The areas of the element 1, 2 and 3 are 2000, 2500 and 2500 mm² respectively.

Assume $E = 2 \times 10^5$ N/mm².



Or

(b) Derive an expression of shape function and stiffness matrix and force vector for 2D linear elements.

13. (a) Determine the deflection at midspan of a simply-supported beam loaded by a concentrated load W at the centre (midspan) using Rayleigh–Ritz method.

Or

(b) Derive the conductance matrix for two dimensional heat transfer and explain its boundary conditions.

14. (a) Write short notes on :

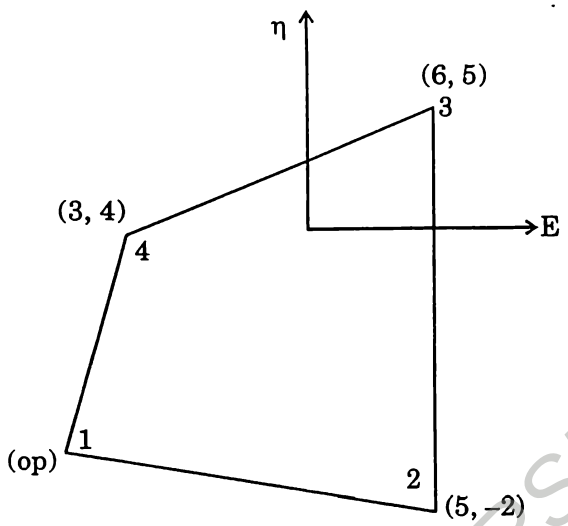
(i) Isoparametric elements.

(ii) Accuracy and mesh distortion.

(iii) Weighted residual methods.

Or

(b) Determine the Jacobian matrix for the isoparametric quadrilateral element shown below :



(4 × 15 = 60 marks)

C 83765 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Mechanical Engineering

ME 14 704C—RENEWABLE ENERGY TECHNOLOGY

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Differentiate between beam radiation and diffuse radiation.
2. Write short notes on flat plate collectors.
3. Define the following : (i) Zenith (ii) Solar altitude angle (iii) Solar azimuth angle.
4. Classify the energy storage systems
5. Explain pumped hydroelectric energy storage with a neat sketch
6. What is biomass ? What are different resources use to extract biomass energy ?
7. List the factors to be considered while selecting the site for a biogas plant.
8. Compare horizontal axis and vertical axis wind turbines.
9. State the advantages and disadvantages of wind turbine systems.
10. Explicate about tidal energy.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. (a) Discuss the solar radiation measurement techniques with neat sketches.

Or

(b) A cylindrical parabolic concentrator with width 2.0 m and length 8 m has an absorbed radiation, per unit area of aperture, of 400 W/m^2. The receiver is a cylinder painted flat black and surrounded by an evacuated glass cylindrical envelope. The absorber has a diameter of 55 mm, and the transparent envelope has a diameter of 85 mm. The collector is designed to heat a fluid entering the absorber at 220°C at a flow rate of 0.04 kg/s. The value of Cp for the fluid

Turn over

is 3.26 kJ/kg°C. The heat transfer co-efficient inside the tube is 280 W/m^2°C and the overall loss coefficient is 12 W/m^2 °C. The tube is made of stainless steel (K = 16 W/m °C) with a wall thickness of 5 mm. If the ambient temperature is 22 °C, calculate the useful gain and exit fluid temperature.

12. (a) Discuss the energy storage using lead acid battery with neat sketches.

Or

(b) Describe about sensible heat energy storage.

13 (a) Write short notes on the following biomass conversion technologies :

(i) Fermentation. (5 marks)

(ii) Pyrolysis. (5 marks)

(iii) Anaerobic digestion. (5 marks)

Or

(b) With a neat sketch discuss the working principle of floating drum type biogas plant. Also state its advantages and disadvantages.

14. (a) Explain the various components of wind energy-conversion system with neat sketch.

Or

(b) Discuss the following Ocean Thermal Energy Conversion (OTEC) technologies :

(i) Closed-cycle system. (5 marks)

(ii) Open-cycle system and (5 marks)

iii) Hybrid system. (5 marks)

[4 × 15 = 60 marks]

C 83764 (Pages : 2) Name.....

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SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Mechanical Engineering

ME 14 704B—INDUSTRIAL SAFETY ENGINEERING

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Write short notes on work permit system.
2. What are the different hazard identification and control techniques ?
3. Write the steps followed in FMECA.
4. Discuss briefly about hearing conservation program.
5. What is meant by fire hydrant ? What are its types ?
6. Write a note on logics of consequence analysis.
7. What is Threshold Limit Value (TLV) ?
8. Discuss briefly about dispersion modelling.
9. Write short notes on reliability.
10. Find the reliability of the system with three components A, B and C connected in parallel. The system reliabilities of A, B and C are 0.95, 0.92 and 0.90 respectively.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. Explain in detail about HAZOP.

Or

12. Discuss in detail about steps in FMEA.

Turn over

13. Explain in detail about different types of fire.

Or

14. Describe in detail about types of fire extinguishers.

15. Explain the construction and working of gravitational settling chamber with neat sketch.

Or

16. Discuss the construction and working of fabric filter with neat sketch.

17. Explain in detail about Weibull distribution.

Or

18. Explain in detail about reliability of systems with components in series and parallel.

(4 × 15 = 60 marks)

C 83763 (Pages : 2) Name.....

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SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Mechanical Engineering

ME 14 704A—FINANCIAL MANAGEMENT

Time : Three Hours Maximum : 100 Marks

Part A

I. Answer any *eight* questions out of ten :

1 Write notes on profit maximization approach.

2 Discuss the various forms of dividends.

3 List the stages of capital budgeting process.

4 Explain the process of average rate of return method.

5 What are the social responsibilities of a firm?

6 A project requires an initial investment of $225,000 and is expected to generate the following net cash inflows : Year 1 : $95,000, Year 2 : $80,000, Year 3 : $60,000, Year 4 : $55,000. Compute net present value of the project if the minimum desired rate of return is 12%.

7 Explain the term retained earnings.

8 What are the dangers of inadequacy of working capital ?

9 What are the advantages and disadvantages of debt financing ?

10 What is lease financing ? Give an example.

(8 × 5 = 40 marks)

Part B

II. Answer *all* questions :

11 Discuss in detail the internal and external factors influencing financial decisions.

Or

12 With examples, explain the salient features of traditional and modern approaches to financial management.

13 Explain about the nature of capital budgeting.

Or

14 An investment proposal P requires an initial capital outlay of Rs. 2,00,000, with no salvage value, and will be depreciated on a straight-line basis for tax purposes. The earnings before depreciation and taxes (EBDT) during its 5-year life are :

Year	1	2	3	4	5
EBDT (Rs.)	70,000	76,000	80,000	60,000	52,000

The corporate tax rate is 35 per cent and the company evaluates its investment projects at 12 per cent cost of capital. Advice the company whether the project should be accepted : (i) when there is no inflation and (ii) when there is inflation at the rate of 15per cent per annum, and the stated gross earnings are also expected to grow at this rate of inflation.

15 Define working capital. What factors would you take into consideration in estimating the working capital needs of a budget hotel ?

Or

16 Discuss the new trends in financing of working capital by banks.

17 What are the reasons for merger of companies ? Write the impact of mergers.

Or

18 Discuss the main sources of finance available to industries for meeting short term as well as long term financial requirements.

(4 × 15 = 60 marks)

C 83762 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Mechanical Engineering

ME 14 703—COMPUTER INTEGRATED MANUFACTURING

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. What do you understand by the word Numerical Control ? Classify NC system.
2. What are the disadvantages of implementing NC technology ?
3. Briefly explain the job of part programmer and computer in computer aided part programming.
4. Briefly discuss the various types of statements in APT language.
5. What is an automated storage system ? What are its two basic categories ?
6. What is AGV ? Name the categories of AGV.
7. Briefly discuss the principle and advantages of group technology.
8. What are the functions of the material handling and storage system in a flexible manufacturing system ?
9. What types of grippers are used in industrial robot applications ?
10. Write short note on the application of robots in welding.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. (a) Describe the three basic components of a numerical control (NC) system. State the advantages of Numerical Control System.

Or

(b) Explain the methods of improving productivity in NC machine.

Turn over

12. (a) List and describe the different group of statements of a part programming language.

Or

(b) Describe the different group of statements of the APT language.

13. (a) Discuss the features of OPTIZ coding system in detail.

Or

(b) Explain in detail about any two automatic data capturing technology.

14. (a) Describe the classification of robotic control system.

Or

(b) Explain in detail about the components of FMS.

(4 × 15 = 60 marks)

C 83761 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Mechanical Engineering

ME 14 702—MACHINE DESIGN–II

Time : Three Hours Maximum : 100 Marks

Answer **all** *the questions.*
Each question carries 25 *marks.*

1. (A) A dry single plate clutch is to be designed for an automotive vehicle whose engine is rated to give 100 kW at 2400 r.p.m. and maximum torque 500 N-m. The outer radius of the friction plate is 25% more than the inner radius. The intensity of pressure between the plate is not to exceed 0.07 N/mm^2. The co-efficient of friction may be assumed equal to 0.3. The helical springs required by this clutch to provide axial force necessary to engage the clutch are eight. If each spring has stiffness equal to 40 N/mm, determine the dimensions of the friction plate and initial compression in the springs.

Or

(B) A 30 kW, 1440 r.p.m., motor is to drive a compressor by means of V-belts. The diameter of pulleys are 220 mm and 750 mm; The centre distance between the compressor and motor is 1440 mm. Design a suitable drive.

2. (A) A transmission shaft rotating at 720 r.p.m. and transmitting power from the pulley P to the spur gear G is shown in Fig. 1. The belt tensions and the gear tooth forces are as follows :

P_1 = 498 N, P_2 = 166 N, Pt = 497 N, Pr = 181 N. The weight of the pulley is 100 N. The diameter of the shaft at bearings B_1 and B_2 is 10 mm and 20 mm respectively. The load factor is 2.5 and the expected life for 90% of the bearings is 8000 h. Select single-row deep groove ball-bearings at B_1 and B_2.

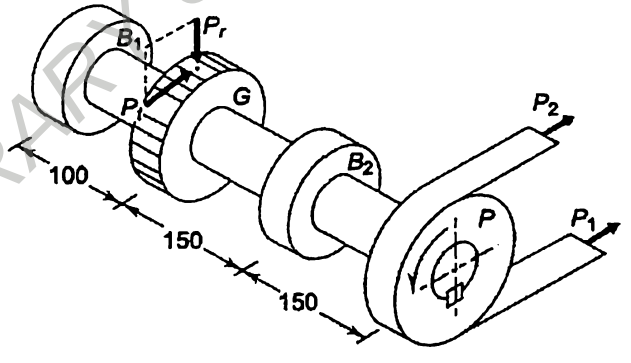


Fig.1

Or

Turn over

(B) The following data is given for a 360° hydrodynamic bearing :

Journal diameter = 100 mm

Bearing length =100 mm

Radial load = 50 kN

Journal speed = 1440 r.p.m.

Radial clearance = 0.12 mm

Viscosity of lubricant = 16 cP

Calculate :

(i) Minimum film thickness.

(ii) Co-efficient of friction.

(iii) Power lost in friction.

3. (A) Design a spur gear drive to transmit 22 kW at 1000 r.p.m. ; Speed reduction is 2.5. The centre distance between the gear shafts is approximately 350 mm. The materials used are : pinion - C45, gear wheel - CI Grade 30. Design the Drive.

Or

(B) Design a worm gear drive to transmit 12 kW at 1200 r.p.m. Speed reduction desired is 30 : 1. The worm is made of hardened steel and the wheel of phosphor bronze. Check the heating capacity of gears and determine the efficiency.

4. (A) A connecting rod is required to be designed for a high speed, four-stroke I.C. engine. The following data are available :

Diameter of piston = 88 mm ; Mass of reciprocating parts = 1.6 kg ; Length of connecting rod (centre to centre) = 300 mm ; Stroke = 125 mm ; R.P.M. = 2200 (when developing 50 kW) ; Possible overspeed = 3000 r.p.m. ; Compression ratio = 6.8 : 1 (approximately) ; Probable maximum explosion pressure (assumed shortly after dead centre, say at about 3°) = 3.5 N/mm^2.

Or

(B) Discuss the design recommendations for castings.

(4 × 25 = 100 marks)

C 83760 (Pages : 4) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Mechanical Engineering

ME 14 701—REFRIGERATION AND AIR CONDITIONING

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. State the limitations of reversed Carnot cycle.
2. Describe the principle of vortex tube or Hilsch tube refrigeration.
3. List the advantages and disadvantages of vapour compression refrigeration system over air refrigeration system.
4. Explain the designation system for refrigerants.
5. Write short notes on two-stage compression system with flash inter-cooling.
6. A mixture of dry air and water vapour is at a temperature of 21°C under a total pressure of 736 mm Hg. The dew-point temperature is 15°C. Find :
   (i) Partial pressure of water vapour.
   (ii) Relative humidity.
   (iii) Specific humidity.
7. Describe about a summer air conditioning system.
8. Explicate the factors affecting comfort air conditioning.
9. 1 m^3 of a gas is compressed adiabatically ($\gamma = 1.4$) from 1 bar to 5 bar in a reciprocating compressor with 8 percent clearance. If the exponent of the re-expansion curve is 1.1 instead of 1,4, find the percentage increase in the work of compression.
10. Describe the axial flow fans used in air conditioning system.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*

Each question carries 15 *marks.*

11. (a) (i) The ambient air temperatures during summer and winter in a particular locality are 45°C and 15°C respectively. Find the values of Carnot COP for an air conditioner for cooling and heating, corresponding to refrigeration temperatures of 5°C for summer and heating temperature of 55°C for winter. Assume suitable temperature differences in the exchanger that exchanges heat with the surroundings.

(ii) If water from cooling tower at 30°C is used as a cooling medium with 3°C temperature differential for air-conditioning in summer, what will be the Carnot COP for cooling ?

(iii) Also, find the theoretical power consumption per ton of refrigeration in each case. Assume no increase in the temperature of the surrounding air or water.

Or

(b) An aircraft flying at an altitude of 8000 m, where the ambient air is at 0.341 bar pressure and 263 K temperature has a speed of 900 km/h. The pressure ratio of the air compressor is 5. The cabin pressure is 1.01325 bar and the temperature is 27°C. Determine the power requirement of the aircraft for pressurization (excluding the ram work), additional power required for refrigeration and refrigerating capacity on the basis of 1 kg/s flow of air.

12. (a) A Freon 12 vapour compression system operating at a condenser temperature of 40°C and an evaporator temperature of 0°C develops 15 tons of refrigeration. Using the p-h diagram for Freon 12, determine :

(i) The discharge temperature and mass flow rate of the refrigerant circulated.

(ii) The theoretical piston displacement of the compressor and piston displacement per ton of refrigeration.

(iii) The theoretical horsepower of the compressor and horsepower per ton of refrigeration.

(iv) The heat rejected in the condenser.

(v) Carnot COP and actual COP of the cycle.

Or

(b) In an ammonia-absorption system with an analyser but without a dephlegmator the following data are given :

Condenser pressure = 20.3 bar

Evaporator pressure = 2.1 bar

Generator temperature = 156 °C

Absorber temperature = 40 °C

Determine, per unit mass of the vapour distilled :

(i) Specific solution circulation rates.

(ii) Temperature at inlet to evaporator if the liquid from the condenser is cooled by 13 °C in the liquid-vapour heat exchanger.

(iii) The refrigerating effect if the maximum refrigeration temperature is 5° C.

(iv) The heat transfer in the liquid-liquid heat exchanger.

(v) The heat added in the generator.

13. (a) The atmospheric air at 760 mm of Hg, dry bulb temperature 15°C and wet bulb temperature 11°C enters a heating coil whose temperature is 41°C. Assuming by-pass factor of heating coil as 0.5, determine dry bulb temperature ; wet bulb temperature and relative humidity of the air leaving the coil. Also determine the sensible heat added to the air per kg of dry air.

Or

(b) A laboratory having an unusually large latent heat gain is required to be air conditioned. The design conditions and loads as follows :

Summer design conditions : 40 °C DBT, 27 °C WBT

Inside design conditions : 25 °C DBT, 50% RH

Room sensible heat : 34.9 kW

Room latent heat : 18.6 kW

The ventilation air requirement is 85 cmm. Determine the following :

(i) Ventilation load.

(ii) Room and effective sensible heat factors.

(iii) Apparatus dew point and amount of reheat for economical design.

(iv) Supplied air quantity.

Assume a suitable bypass factor.

14. (a) Describe the following evaporators with neat sketches :

(i) Shell and tube evaporators.

(ii) Finned evaporators.

Or

(b) With a neat sketch, discuss the working principle of an automatic expansion valve. Also state its applications.

(4 × 15 = 60 marks)

C 83759 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Information Technology

IT 14 704E—SOFTWARE QUALITY MANAGEMENT

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Detail the need for Quality Function Deployment and Benchmarking in software process Management.
2. Write the role of software quality Assurance.
3. Explain about the types of baselines and questions that a software configuration management should answer.
4. List the Software Configuration Management support Functions.
5. Enumerate the reason for software standard and its benefit.
6. Briefly explain how inspections are conducted in software development process ?
7. How will you establish a software quality program ?
8. What is the role of management in defect prevention ?
9. Explain path selection in unit and functional testing.
10. List the steps in establishing software quality program.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. (a) Explain the software assessment process in detail.

Or

(b) Describe how the cost of quality is calculated ? Also write a note on seven quality control tools.

Turn over

12. (a) What are the SCM audits that are conducted before each phase of software development and specify the ground rules for it. Explain in detail.

Or

(b) Give an account of basic configuration management in detail.

13. (a) Explicate the steps in establishing software standards.

Or

(b) Explain the need for quality standards. Explain CMM and ISO 9000 series.

14. (a) Describe the testcase design guidelines and how these test cases are executed and reported.

Or

(b) Write a note on process changes required in order to incorporate defect prevention. Also describe the defect prevention considerations.

(4 × 15 = 60 marks)

C 83757 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Information Technology

IT 14 703—INTERNET TECHNOLOGIES

Time : Three Hours Maximum : 100 Marks

Part A (Short Questions)

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Discuss the various interactions of Client and Server model.
2. Define RPC and mention its usage.
3. What is meant by VoIP ?
4. List the various types of differentiated services.
5. Describe the procedure for streaming audio and video.
6. Discuss about internet telephony.
7. Describe about unique features of E-commerce.
8. Mention the role of Net Marketers.
9. Write the principle of operation involved in implementing Digital payments.
10. Explain about the trends in Supply Chain Management and collaborative commerce.

(8 × 5 = 40 marks)

Part B (Descriptive Questions)

Answer **all** *questions.*
Each question carries 15 *marks.*

11. Write in detail about E-mail representation and transfer mechanism.

Or

12. Explain the following ; i) Middleware ii) Remote File Access.
13. Explain briefly about Stored Audio and Video telephony system.

Or

14. Explain the internet network management framework in detail.

Turn over

15. Give a detailed comparison of E-commerce and E-business.

Or

16. Explain the procedure involved in building an E-Commerce website.

17. Explain the operations involved in E-commerce B2C payment systems.

Or

18. Write short notes on B2B Payment Systems.

(4 × 15 = 60 marks)

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, APRIL 2020

Computer Science Engineering

CS 14 705E—COMPUTER BASED NUMERICAL METHODS

Time : Three Hours Maximum : 100 Marks

Part A

Analytical / Problem solving short questions.
Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Calculate the root of $e^x - 3x = 0$ in $1 < x < 1.1$ by Iteration method.
2. Solve the following system of equations by Gauss-Elimination method $5x + 4y = 15, 3x + 7y = 12$.
3. Using Gauss-Jordan method, solve the following system ot equations $5x + 4y = 15, 3x + 7y = 12$.
4. On what type of equations Newton's method can be applicable—Justify.
5. Estimate $f(a, b)$ and $f(a, b, c)$ using divided differences, if $f(x) = 1/x$.
6. Using Trapezoidal rule evaluate $\int_0^{\pi} \sin x dx$ by dividing the range into 6 equal parts.
7. Compare trapezoidal rule and Simpson's one third rule.
8. Write down the Gaussian quadrature 3 point formula.
9. What is Bender-Schmidt recurrence equation ? For what purpose it is used ?
10. State the explicit formula for the one dimensional wave equation with

    $1 - \lambda^2 a^2 = 0$ where $\lambda = k/h$ and $a^2 = T/m$.

(8 × 5 = 40 marks)

Part B

Descriptive / Analytical / Problem solving questions.

11. By Gauss seidel method to solve system of equations :

$x + y + 54z = 110$; $27x + 6y - z = 85$; $6x + 15y - 2z = 72$.

Or

Derive a Newton-Raphson iteration formula for finding the cube root of a positive number N. Hence find $\sqrt[3]{12}$.

12. Evaluate $f(1)$ using Lagrange's method :

X	– 1	0	2	3
Y	– 8	3	1	12

Or

Find the interpolated value for $x = 3$ of the given using Lagrange's interpolation :

x	3.2	2.7	1.0	4.8
$f(x)$	22.0	17.8	14.2	38.3

13. Find the value of $f(8)$ from the table given below :

x	6	7	9	12
$f(x)$	1.556	1.690	1.908	2.158

using suitable formula.

Or

The Velocity v(km/ min) of a moped which starts from rest, is given at fixed intervals of time (min) as follows :

T	0	2	4	6	8	10	12
V	4	6	16	34	60	94	131

Estimate approximate distance covered in 12 minutes, by Simpson's 1/3 rd rule, also find the acceleration at t = 2 seconds.

14 Apply modified Euler method to find $y(0.2)$ and $y(0.4)$ given $y' = x^2 + y^2$, $y(0) = 1$, $h = 0.2$.

Or

Apply Runge-Kutta method of order 4 solve $y' = y - x^2$, with $y(0.6) = 1.7379$, $h = 0.1$ find $y(0.8)$.

(4 × 15 = 60 marks)

C 83755 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Computer Science Engineering

CS 14 705 (C)—SOFTWARE ARCHITECTURE AND PROJECT MANAGEMENT

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. (a) Which are the influencing factors that affect the architecture design?

   (b) Define the terms (i) Viewtypes ; (ii) Styles.

   (c) Give guidelines for writing an Interface Specification.

   (d) What is shared-data style ? Give any two examples.

   (e) Describe forward-receiver design patterns.

   (f) Describe Rule Archetype Pattern.

   (g) What are the two types of Adapter Patterns ?

   (h) Which are the two types of Brokers ?

   (i) Write the responsibilities of the principal layers in Enterprise Application.

   (j) What do you mean by Metadata mapping ?

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

2. Discuss the design activities for the conceptual architecture view.

Or

3. Describe the techniques for documenting behavioural aspects of the interactions among system elements.

4. Explain Model Driven Architecture with Archetype Patterns.

Or

5. Write a short note on (a) Access Control Patterns ; (b) Service Variation Patterns.

Turn over

6. Explain the Presentation–Abstraction–Cobtrol (PAC) patterns for interactive systems.

Or

7. Discuss about the patterns for distributed computing.

8. Briefly explain the following :

   (i) Transactional Middleware and EAI.

   (ii) Java Middleware and EAI.

Or

9. Explain about Offline Concurrency Patterns.

(4 × 15 = 60 marks)

C 83754 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Computer Science Engineering

CS/IT 14 705 B—E-COMMERCE

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Discuss how E-Commerce is helpful to business success.
2. Discuss the benefits and limitations of E-Commerce.
3. What are the advantages and disadvantages of a Smart Card ?
4. What do you understand by Electronic Funds Transfer ?
5. Write in short about Features of an e-payment system.
6. What is EDI ? Discuss its layered structure.
7. Write notes on ethical, social and political issues in EC.
8. Discuss any two passive and active advertising methods.
9. What are the desirable characteristics of an Electronic Market Place ?
10. Explain the role and support of E-Commerce in travel applications.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11 a) Compare and contrast the traditional business with electronic commerce in a book shop business.

Or

b) Explain the framework and components of E-Commerce architecture.

12 a) Describe the functional requirements for online selling and what specialized services and servers perform these functions.

Or

Turn over

b) Describe the characteristics of the types of payment system and give an application example for each type.

13. a) Discuss in detail about the security issues for which electronic cash is transferred over internet with an example.

Or

b) Explain the role of EC in supply chain management and retailing.

14. a) Write about the major methods of Internet advertisement and discuss how product comparison process can be used as on opportunity of advertisement.

Or

b) Explain the security measures to be considered for any B2B E-Commerce system.

(4 × 15 = 60 marks)

C 83753 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Computer Science Engineering

CS/IT 14 705A—SOFT COMPUTING

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Briefly explain supervised and unsupervised learning.
2. Define the fitness f of bit string x with I = 4 to be the integer represented by the binary number x. (e.g., $f(0011) = 3$, $f(1111) = 15$). What is the average fitness of the schema 1*** under f ?
3. What are the implementation issues in genetic algorithms.
4. What is perception? Explain perceptron learning.
5. Write notes on supervised and unsupervised learning.
6. Explain Hopfield network.
7. Write a note on fuzzy measures.
8. Explain fuzzy set operations.
9. Explain the design of swarm intelligence systems.
10. Write a note on evolutionary algorithms.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. (a) Explain the selection methods used in genetic algorithms.

Or

(b) Explain genetic operators and parameters with example.

Turn over

12. (a) Explain competitive networks, in detail.

Or

(b) Explain the back propagation algorithm.

13. (a) Explain the design process of fuzzy logic control system.

Or

(b) Explain fuzzy relations and fuzzy logic rule base.

14. (a) What are the uses of support vector machine ? Explain.

Or

(b) Explain harmony search algorithm. What are its applications ?

(4 × 15 = 60 marks)

C 83752 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Computer Science Engineering

CS/IT 14 704C—GRID COMPUTING

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. State the need for internet computing.
2. What are the benefits of Cluster Computing ?
3. Bring out the procedure for creating grid services.
4. Write short notes on grid enabling software.
5. What do you mean by desktop supercomputing ?
6. Write about the native programming for Grids.
7. Mention any *five* salient features of OSGI.
8. Explain the OGSA basic services.
9. Brief about the application of Grids in Life Sciences.
10. What are the features of GLOBUS GT3 toolkit ?

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. (a) Explain in detail about types of Grids in detail.

Or

(b) Explain in detail about Grid Infrastructure and Grid applications.

Turn over

12. (a) Discuss in detail about Open Grid Service Architecture with neat sketch.

Or

(b) Explain in detail about managing grid environments.

13. (a) Explain in detail about the technical details of OSGI specification.

Or

(b) Elaborate in detail about name and change management in Grid service.

14. (a) Explain in detail about setting up of the Grid and the deployment of Grid software.

Or

(b) Explain in detail about hive computing for transaction processing Grids.

(4 × 15 = 60 marks)

C 83751 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Computer Science Engineering

CS/IT 14 704B—DIGITAL IMAGE PROCESSING

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Explain about image geometry.
2. List the properties of DFT.
3. Explain the principle of operation involved in Hotelling transform
4. Explain about histogram equalization.
5. What is meant by Homomorphic filtering ? Explain.
6. Write about the principle of operation involved in image subtraction.
7. Sketch the block diagram for image degradation model and explain.
8. Illustrate region splitting and region merging concepts.
9. Explain in detail about Bit plane coding.
10. Differentiate between lossless and lossy compression techniques.

(8 × 5 = 40 marks)

Part B

Answer ***all*** *questions.*
Each question carries 15 *marks.*

11. (a) Explain in detail about the Walsh-Hadamard transform mechanism.

Or

(b) Explain the image formation in eye and the principle of operation of brightness adaption and discrimination.

Turn over

12. (a) Describe histogram equalization. Obtain Histogram equalization for the following image segment of size 5 × 5 ? Write the inference on image segment before and after equalization.

20	20	20	18	16
15	15	16	18	15
15	15	19	15	17
16	17	19	18	16
20	18	17	20	15

Or

(b) Explain spatial correlation and convolution with suitable examples.

13. (a) Classify the types of order statistic filter. Demonstrate the operations of order statistic filter.

Or

(b) Evaluate the advantages and disadvantages of using more than one seed in a region growing technique.

14. (a) Evaluate the need for image compression. How run length encoding approach is used for compression ? Is it lossy ? Justify.

Or

(b) Examine with suitable example for huffman coding scheme results with image compression.

(4 × 15 = 60 marks)

C 83750 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Computer Science Engineering

CS 14 704 A—OBJECT ORIENTED MODELING AND DESIGN

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. What is a model ? What purpose does it serve ? Explain.
2. Explain use case generalization with an example.
3. What are the features of a communication diagram ?
4. Explain activity diagram with the UML notation. Give an example.
5. Mention the points to be considered while designing a workflow.
6. What is meant by composite state ? Explain with an example.
7. What is OCL ? Bring out its need.
8. Write the syntax for invariant in OCL expression.
9. Explain about well formed design classes.
10. Draw a state machine model for online retail system.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. (a) Develop a use case model for online banking system.

Or

(b) Draw a detailed class diagram with attributes and operations for an online shopping.

12. (a) Draw the use-case diagram for vending machine. What are the guidelines needed to be followed while drawing use-case models ?

Or

(b) What is an activity diagram ? Explain the activity diagram for stock trade processing.

Turn over

13. (a) Explain the role of interfaces and components in detail with examples.

Or

(b) Draw state machine diagram and submachine state diagram for any one real time application and explain the same.

14. (a) Explain in detail about types of OCL expressions.

Or

(b) Explain in detail about Implementation workflow and deployment in object oriented modelling and design.

(4 × 15 = 60 marks)

C 83749 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Computer Science Engineering

CS 14 703—ARTIFICIAL INTELLIGENCE

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Discuss the significance of heuristics.
2. Is A* optimal under all situations ? Justify.
3. Discuss BFS with an example.
4. Represent the following statement in Predicate logic.

   " Every city in Canada is clean"
5. What is meant by Existential Quantifier. Explain with an example.
6. Discuss the need for unification in Resolution.
7. What is meant by speech acts ? Explain.
8. What are Language Strings ? Discuss.
9. Whatis meant by meta interpreter ? Discuss.
10. What are Lamda Expressions ? Explain.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. (a) Briefly discuss the characteristics of production systems ?

Or

(b) Write notes on applications of Artificial Intelligence.

Turn over

12. (a) A set of statements are given below :

1 Whoever can read is literate.

2 Dolphins are not literate.

3 Some Dolphins are intelligent.

Prove that "Some who are intelligent cannot read".

Or

(b) Using Rules of inference check the validity of the given set of statements .

"If Jack misses many classes through illness, then he fails high school

If Jack fails high school, then he is uneducated

If Jack reads a lot of books, then he is not uneducated.

Jack Misses many classes through illness and reads a lot of books".

13. (a) Explain in detail about communication among agents.

Or

(b) Discuss the following terms in connection with neural networks :

(i) Generalization ; (ii) Accuracy ; and (iii) Integration.

14. (a) With suitable examples discuss in detail about representation of facts in PROLOG.

Or

(b) Write notes on basic LISP primitives.

(4 × 15 = 60 marks)

C 83748 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Computer Science Engineering

CS/IT 14 702—CRYPTOGRAPHY AND NETWORK SECURITY

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Use Caesar cipher with key = 15, to encrypt the message "Welcome".
2. Distinguish between streams and block ciphers.
3. What are the weaknesses of DES ?
4. Give any four names of substitution techniques.
5. Highlight the differences between diffusion and confusion.
6. Write a note on PGP in detail.
7. Explain about S/MIME in detail.
8. Distinguish between message integrity and message authentication.
9. List the features of X509 authentication service.
10. List the IP security features.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. Discuss in detail about the types of attacks in detail.

Or

12. Discuss in detail about Transposition and substitution cipher mechanism with examples.
13. Explain the Diffie - Hellman Key Exchange protocol in detail.

Or

14. Explain in detail about Elliptic Curve Cryptography with neat diagram.

Turn over

15. Explain the working of Kerberos in detail.

Or

16. Why does PGP compress the message ? What are the reasons for compressing the signature but before encryption ?

17. Explain the firewall mechanism in detail.

Or

18. Describe in detail about Socket layer and transport layer security with neat diagram.

(4 × 15 = 60 marks)

C 83747 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Computer Science Engineering

CS/IT 14 701—DESIGN AND ANALYSIS OF ALGORITHM

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. If $f(n) = n^3 + 3n^2 + n$, find O,Ω and ∅.
2. Solve the recurrence relation

$$T(n) = \begin{cases} 3T(n/2) + kn & n > 1 \\ 1 & n = 1 \end{cases}.$$

3. Define Subset Paradigm of Greedy method. Give an example.
4. Draw the state space tree generated by Backtracking approach for sum of subsets problem using variable tuple size formulation.
5. Write the algorithm for LC Branch and Bound method.
6. When can we say that a problem belongs to NP class ? Give an example.
7. Show that clique problem is NP-complete.
8. For the following graph Fig. 1, find the chromatic number (m). How many solutions exist with exactly m colors ? Draw the state space tree :

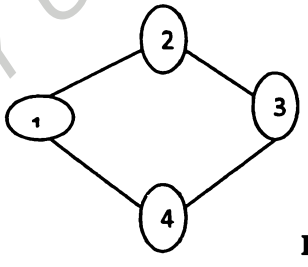


Fig: 1

9. Explain les vegas algorithm.
10. Give a randomised solution to solve 8-queen's problem.

(8 × 5 = 40 marks)

Turn over

Part B

*Answer **all** questions.*

Each question carries 15 *marks.*

11. a) What do you mean by efficiency of an algorithm ? How can you compare the efficiency of 2 algorithms ? Explain the concept of best case, average case and worst case time complexity.

Or

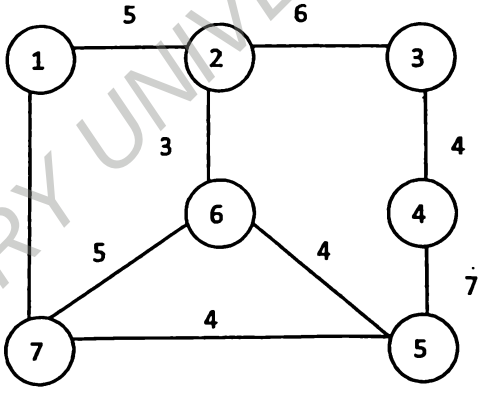
b) Write a program to find the nth power of a number x (x power n) using recursion. Find the recurrence relation and solve the same.

12. a) Find the minimum cost tour for the following Travelling Salesman Problem using Branch and Bound method.

	A	B	C	D	E
A	∞	11	10	9	6
B	9	∞	7	3	4
C	6	4	∞	4	8
D	11	10	5	∞	5
E	6	9	5	2	∞

Or

b) For the following graph, construct a minimum cost spanning tree using Prim's method. Also write the algorithm.



13. a) Given an undirected graph, how will you find minimum size vertex cover. Explain with an example.

Or

b) With an example, explain the Hamiltonian cycle problem.

14. a) Explain Pollard's rho heuristic in detail with procedures and illustrations.

Or

b) Describe randomised sorting with an example.

(4 × 15 = 60 marks)

C 83746 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Civil Engineering

CE 14 705D—GROUND WATER HYDROLOGY

Time : Three Hours Maximum : 100 Marks

Part A

I. Answer any *eight* questions out of ten :

1 What is meant by porosity and permeability ? Identify their significance in groundwater formation and storage.

2 What is a flownet ? Outline the general rules for construction of flownet.

3 Distinguish between isotropic - anisotropic and homogenous - heterogeneous aquifers.

4 What is well interference ? How the total drawdown at given point due to pumping of multiple wells in confined aquifer is determined ?

5 State the principle involved in the recuperation test of an open well. Write the expression for specific capacity of the well.

6 How the optimum length of well screen is chosen ? Distinguish how screen length varies for water table aquifer and artesian aquifers.

7 Under what circumstances can a radial collector well be most advantageously used ?

8 Outline method and necessity of grouting of tube wells.

9 What is meant by artificial recharge of groundwater ? State its objectives.

10 Give the water quality criteria for evaluating suitability of water for drinking and for irrigation.

(8 × 5 = 40 marks)

Part B

II. Answer *all* questions :

11 (i) Illustrate and discuss the various zones of occurrence subsurface water. Discuss the importance of zone of saturation in groundwater development.

(7 marks)

(ii) Two piezometric heads 750 m apart measures a groundwater head of 115 m and 110 m respectively in a confined aquifer. The rate flow is 1950 m^3/d. The thickness of the aquifer is 45 m and its width is 2 kms. A 750 mm long sample from this aquifer is placed in a falling head permeameter having the initial water level of 1150 mm. The diameter of the permeameter and the tube is 250 mm and 10 mm respectively. Compute the time in seconds when the water level in the standpipe will be 100 mm. (8 marks)

Or

12 (i) A steady discharging well of diameter 300 mm penetrates fully into a confined aquifer of thickness 20 m. Calculate the yield from the well under a drawdown of 5 m. Take the coefficient of permeability of aquifer as 60 m/d and circle of influence as 200 m. (8 marks)

(ii) Differentiate between confined and unconfined aquifers. (7 marks)

13 (i) Derive the general flow equation of groundwater. Provide the general flow equations in saturated media for confined aquifers under various conditions. (8 marks)

(ii) Sketch a piezometric profile of a pumping well near the interception of a barrier boundary. Discuss how the well hydraulics is analysed in such situation. (7 marks)

Or

14 Explain the steps involved in Theis method and Cooper - Jacob time drawdown test for determining aquifer parameters.

15 (i) Discuss the advantages and disadvantages of open wells. (8 marks)

(ii) Describe the construction of radial well. (7 marks)

Or

16 (i) Outline the principle involved in the well losses and well efficiency. (7 marks)

(ii) Sketch a typical infiltration gallery. Calculate the discharge per unit length of the infiltration gallery by making suitable assumptions. (8 marks)

17 (i) Describe the various methods of prevention of saltwater intrusion in aquifers. (8 marks)

(ii) Mention various methods geophysical exploration of groundwater. Describe the electrical resistivity method. (7 marks)

Or

18 Outline the main objectives and benefits of artificial recharge of groundwater. Explain the various methods of artificial recharge.

[4 × 5 = 20 marks]

C 83745 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Civil Engineering

CE 14 705 B—SOIL EXPLORATION, TESTING AND EVALUATION

Time : Three Hours Maximum : 100 Marks

Part A

I. Answer any *eight* questions out of ten :

1 Discuss the various objectives of soil exploration.

2 Mention the different methods of boring.

3 How to prepare soil investigation report ?

4 Distinguish between compaction and consolidation.

5 When will you prefer variable head permeability method ?

6 Explain standard penetration test.

7 What is the assumption made in field permeability ?

8 What is necessity of doing the vane shear test ?

9 List the various methods that can be adopted for improving the Quality of rock.

10 Different between laboratory and field test of rocks.

(8 × 5 = 40 marks)

Part B

II. Answer *all* the questions :

11 What are the methods of soil boring ? Explain in detail suitable sketches.

Or

12 Describe in detail about the procedure to be followed for the preparation of report on soil exploration.

13 Derive the Terzagi's equation for the one dimensional consolidation process in soil.

Or

14 Discuss the pore pressure parameters in strength of soils. What are the uses of applications of it ?

Turn over

15 Explain the procedure of plate load test with neat sketch and state the limitations.

Or

16 Write short notes on the following :

(a) Dynamic cone penetration test.

(b) Pressure meter test.

17 Describe the different techniques used for the testing of deformability of rocks.

Or

18 Explain in detail about the procedure of estimation of elastic modules of rock.

(4 × 15 = 60 marks)

C 83744 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Civil Engineering

CE 14 704E—CONCRETE TECHNOLOGY

Time : Three Hours Maximum : 100 Marks

Part A

I. Answer any *eight* questions out of ten :

1 List the physical properties of Ordinary Portland cement.

2 Demonstrate the retarding effect of piasticizers.

3 Compare flaky and elongated aggregate with neat sketch.

4 Briefly discuss the applications of polymer impregnated concrete.

5 Describe the manufacturing procedure of ready mix concrete.

6 List the advantages of BIS method and ACI method.

7 Describe the information required for concrete mix design.

8 How to measure corrosion in reinforcement bar ?

9 How aggregate properties affect the creep of the concrete ?

10 List the factors affecting the shrinkage of concrete.

(8 × 5 = 40 marks)

Part B

II. Answer *all* questions :

11 Explain about the compatibility of superplasticzers and cement in detail.

Or

12 Explain the test procedure of los angles abrasion and impact strength test on aggregates.

13 Write a short note on the selection of materials and proportioning of mixtures suitable for use in fiber-reinforced concrete, with special attention to how the requirements of toughness and workability are harmonized.

Or

14 Illustrate briefly the materials, mechanisms and test procedures in fresh and hardened state adopted for High performance concrete and self compacting concrete. Also indicate their applications in construction practice.

Turn over

15 Design the mix proportion of M30 grade concrete by Indian standard method. Using the following data: cement-OPC 53 Grade, aggregate-20 mm, minimum cement content-320 kg/m^3, W/C ratio-0.45, slump-100 mm , exposure condition- Severe, method of placing concrete-pumping concrete, chemical admixture-super plasticizer, degree of supervision-good, Specific gravity of cement coarse aggregate, fine aggregate –3.15, 2.78, 2.70, water absorption by coarse aggregate –0.5 percent and free surface moisture in fine aggregate –1.0 percent. Grading of coarse aggregate is conforming to table 2 of IS 383 and grading of fine aggregate is falling in zone-II.

Or

16 Explain the test procedure for ultra sonic pulse velocity and carbonation in detail.

17 Discuss about the various types of shrinkage of concrete with the help of neat sketch.

Or

18 Illustrate the concept of durability with the help of sketch. Explain about permeability of hardened cement paste, aggregates, and concrete in detail.

(4 × 15 = 60 marks)

83743 Pages (2) Name: .....

Reg. No.: .....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME)

(SUPPLEMENTARY) EXAMINATION, APRIL 2020

Civil Engineering

CE 14 704 C – HIGHWAY PAVEMENT DESIGN

Time: Three Hours Maximum : 100 Marks

Part A

I. *Answer any* **eight** *questions out of ten:*

1. What are the different types of pavements? Explain.
2. Distinguish between Airport and Highway Pavement.
3. Discuss the role of moisture and temperature on pavements.
4. What do you understand by equivalent single wheel load?
5. Define wheel load stress.
6. What is rigid pavement?
7. Define the term warping stresses.
8. Write a short note on plate load test.
9. What is meant by depth of frost penetration?
10. What is functional evaluation of pavement?

(8x5 = 40 marks)

Part B

II. *Answer* ***all*** *questions.*

11. a) Describe the various factors to be considered in the design of pavements.

Or

b) Discuss the design of Bituminous mixes by Marshall method

12. a) Explain the Mcleod method of design of flexible pavements.

Or

Turn over

b) Design flexible pavement using IRC 37 2001 for the following data:

Number of commercial vehicles in each direction = 500

Construction period = 2 years

Annual growth rate = 7.5%

CBR Value = 6%

Road type = SH

Pavement width = Tm

Design period = 20 years

13. a) How will determine the thickness of pavement by design wheel load? Explain.

Or

b) Differentiate between longitudinal , contraction and expansion joints.

14. a) What is meant by pavement distress? Explain the structural failures of the pavement stating its remedies and causes. Discuss the design procedure of pavement overlays.

Or

b) Explain the principle and uses of Benkelman beam test.

(4 x15 = 60 marks)

C 83742 (Pages : 4) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Civil Engineering

CE 14 704 A—ADVANCED STRUCTURAL DESIGN—I

Time : Three Hours Maximum : 100 Marks

Part A

Answer **eight** *questions.*
Each question carries 5 *marks.*

1. Explain the limitations of yield line theory.
2. Give the sequence of steps in the design for Corbels.
3. List the assumptions for equivalent frame method of analysis of flat slab.
4. How is the load analysed when live load exceeds ¾th dead load in the design of a flat slab ?
5. A reinforced concrete chimney 50 m. high above ground has an outside diameter of 4 m. The thickness of the shell is 20 cm. at the top and it is increased to 25 cm. and 30 cm. at 18 m. and 30 m. from the top. Vertical steel bars = 1 percent of the cross sectional area throughout. The total wind load above the section at 18 m. from top may be taken as 93 kN. Find the stresses developed due to wind and dead loads at the Section 18 m. from the top of the top of the chimney. Assume modular ratio m = 13.
6. Sketch and explain the types of steel Chimneys.
7. Sketch and explain the design for flue gas opening in a self supporting chimney.
8. Give the procedure along with equations in designing the lateral force of a building.
9. Explain the Complete Quadratic Combination (CQC) method for obtaining the peak response quantity of interest for a MDOF system.
10. State the code for ductility detailing and list where it is required ?

Design of structures: IS : 456 - 2000 (modified by the provisions of IS 13920 : 1993).

(8 × 5 = 40 marks)

Turn over

Part B

Answer any **four** *questions.*
Each question carries 15 *marks.*

11. Explain the procedure for design for flexure using empirical design method for deep beams with relevant equations.

Or

12. Determine the required reinforcement for the bracket shown in figure 1 according to the following data :

Bracket dimensions ($b \times t$) = 300 mm. × 800 mm. and d = 750 mm.

Factored vertical load Q = 500 kN

Factored horizontal load N_u = 100 kN

f_{cu} = 25 N/mm^2 and f_y = 240 N/mm^2.

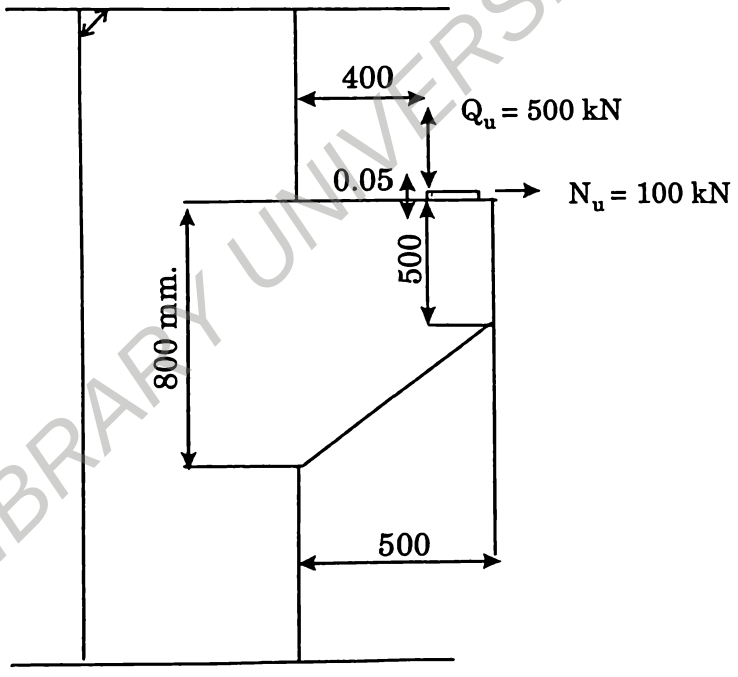


Figure 1

13. A flat slab system consists of 5 m. × 6 m. panels and is without drop and column head.

It has to carry a live load of 4 kN/m^2 and a finishing load of 1 kN/m^2. It is to be designed using M 20 grade concrete and Fe 415 steel. The size of the columns supporting the system is 500 × 500 mm. and floor to floor height is 4.5 m. Calculate design moments in interior and exterior panels at column and middle strips in both directions.

Or

14. Design a portal frame hinged at base to suit the following data :

Spacings of portal frames	= 4 m. centres.
Height of columns	= 4 m.
Distance between column centres	= 10 m.
Live load on roof	= 1.5 kN/m^2.
Safe bearing capacity of soil	= 200 kN/m^2.

R.C.C. slab is continuous over portal frames.

Adopt M 20 grade concrete and Fe 415 grade tor steel.

Design the slab portal frame (design of foundations is not required).

15. Design a two span continuous beam (light gauge member) of span 4.5 m. subject to a UDL of 4 kN/m. as shown in Figure 2.

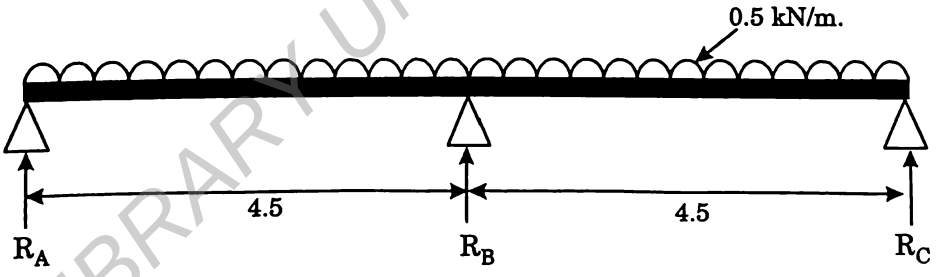


Figure 2

Or

16. Explain the procedure for design of steel plate and joints for self supporting chimneys with relevant equations.

17. Explain the general principles and design philosophy for design of earthquake-resistant structure along with the design criteria.

Or

18. Analyses the response of a MDOF system with 'n' degrees of freedom in terms of governing equations starting with equations of motion upto maximum displacement response of a structure in any mode.

(4 × 15 = 60 marks)

C 83741 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Civil Engineering

CE 14 703—ENVIRONMENTAL ENGINEERING—I

Time : Three Hours Maximum : 100 Marks

Part A

I. Answer any *eight* questions out of ten :

1 State the reasons for water pollution.

2 "Rain water harvesting is the need of the hour"—Justify.

3 Give a note on the rate of consumption of water.

4 What are the measures for ground water protection ?

5 State the measures for the maintenance of tube wells.

6 Give an account on the chemical analysis of water.

7 What is tuberculation in pipelines ?

8 How is sedimentation useful in the treatment of water ?

9 Enunciate on various water supply schemes.

10 Give the classification of conduits.

(8 × 5 = 40 marks)

Part B

II. Answer *all* questions :

11 Describe the importance and necessity of water supply schemes.

Or

12 Discuss various approaches to forecast the population.

13 Give a detailed note on the sources of water.

Or

14 Discuss on drinking water standards and quality.

Turn over

15 Draw a typical line sketch of water treatment plant and explain the various components in it.

Or

16 Explain the need and methods for softening and disinfection of water.

17 Give the design layout of pipe networks.

Or

18 Elucidate on cleaning and maintenance in distribution systems.

(4 × 15 = 60 marks)

C 83740 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Civil Engineering

CE 14 702—DESIGN OF HYDRAULIC STRUCTURES

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **four** *questions.*
Each question carries 5 *marks.*

1. List out the various forces acting on dams.
2. Distinguish between modular and non-modular outlets.
3. Why siphon well drops are necessary in canals ?
4. What are cross drainage works ? State the necessities of cross drainage works.
5. What is super passage ?

(4 × 5 = 20 marks)

Part B

Answer any **one** *full question.*
Draw sketches wherever necessary.
The question carries 15 *marks.*

6. (a) Explain the design procedure of an arch dam by thin cylinder theory. (10 marks)

   (b) Write a note on selection of site for dams. (5 marks)

Or

7. (a) Design a concrete gravity dam for the following data :

Maximum allowable compressive stress in concrete	=	3000 kN/m^2.
Maximum reservoir level	=	200.0 m.
R.L. of bottom of dam	=	100.0 m.
Specific gravity of concrete	=	2.4.
Unit wt. of water	=	10 kN/m^3.

* Assume suitable data wherever necessary.

(10 marks)

(b) What are spillways and explain their types ? (5 marks)

Turn over

Part C

Answer any **one** *full question.*
The question carries 65 *marks.*

8. Design the size and number of notches required for a canal drop with the following particulars :

Full supply discharge	= 4 cumecs .
Bed width	= 6.0 m.
F. S. depth	= 1.5 m.
Half supply depth	= 1.0 m.

Assume any other data if required.

Or

9. Design a suitable cross-drainage work, given the following data at the crossing of a canal and drainage :

Canal :

Full supply discharge	= 32 cumecs.
Full supply level	= R.L. 213.5.
Canal bed level	= R.L. 212.0 m.
Canal bed width	= 20.

Trapezoidal canal section with 11/2 H : 1 V slopes.

Canal water depth	= 1.5 m.

Drainage :

High flood discharge	= 300 cumecs.
High flood level	= 210.0 m.
High flood depth	= 2.5 m.
General ground level	= 212.5 m.

Assume any other data if required.

(1 × 65 = 65 marks)

C 83739 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Civil Engineering

CE 14 701—STRUCTURAL DESIGN–III

Time : Three Hours Maximum : 100 Marks

Part A

I. Answer any *eight* questions out of ten :

1 Differentiate between short and long column.

2 List out the loads on columns.

3 Explain the raft foundation.

4 List out main types of RCC retaining walls.

5 Mention classifications of the retaining wall.

6 Types of joints between walls and floor.

7 Differentiate between Pre-tensioning and Post tensioning.

8 Explain the principal of pre-stressing concrete.

9 What is the use of stiffener in plate girder ?

10 List out the important properties of structural steel.

(8 × 5 = 40 marks)

Part B

II. Answer *all* the questions :

11 Design a rcc column having size 300 × 400mm. It is subjected with factored axial force 1000 kN and moment about major axis is 150 kN-m. Column Unsupported length is 3.5 M. The column is effectively held in position and not restrained against rotation in both directions. Use M25 and Fe 415.

Or

12 Design a isolated pad footing (uniform thickness) for an axially loaded column of 450 × 300mm size, the soil bearing capacity (SBC) is 200 kN/m^2. The load coming from column is 1000 KN. Use M20 grade of concrete and Fe 415 grade of steel.

Turn over

13 Design a retaining wall to suit the following data :

Soil Bearing Capacity, qall : 100 kPa

Co-efficient of Soil Friction, ϕ : 30°

Unit Weight of Soil, γ s : 18 kN/m^3

Unit Weight of Water, γ w : 10 kN/m^3

Unit Weight of Concrete, γ c : 25 kN/m^3

Surcharge, ω : 12 kN/m^2

Ground Water Level : –1m from 0.00 level

Height of Surcharge, h : 0.8 m

Height of Wall : 2.0 m

f'c : 32 Mpa

fy : 460 Mpa, concrete cover : 75 mm.

Or

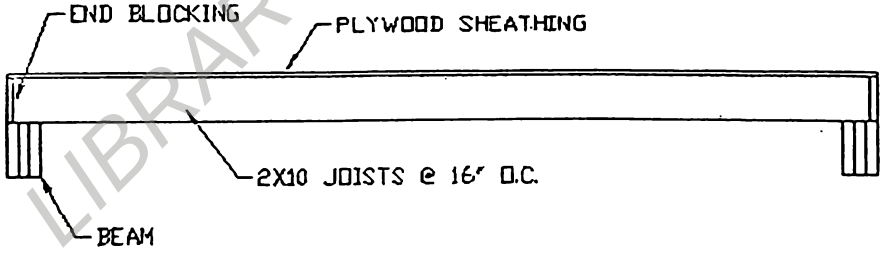
14 Design a circular tank with flexible base for capacity of 500000 litres. The depth of water is to be 4 M. Free board = 200mm. Use grade concrete and grade I mild-steel. Permissible direct tensile in concrete = 1.2 N/mm^2 permissible stress in steel in direct tension = 100 N/mm^2.

15 Explain pre-tensoning and post tensoning methods.

Or

16 Explain PSC structure and its uses.

17 Design of 2 × 10 floor joist with southern pine as shown in figure. 1



Design data :

Length of floor joist : L = 16 ft

Spacing of floor joist : s = 16 in.

Top of joist supported by plywood sheathing.

Or

18 Design a timber column Design data :

Floor area supported by column : A = 80 ft^2

Unsupported length of column, L = 10 ft

Hinge support at top and bottom of column

Design load :

Floor live load : WL = 30 psf

Floor dead load : WD = 10 psf

Superimposed dead load : WSD = 5 psf

Timber : Southern pine, moisture less than 19%, used in normal room temperature.

(4 × 15 = 60 marks)

C 83738 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Applied and Instrumentation Engineering

AI 14 705 A—ADVANCED BIOMEDICAL INSTRUMENTATION

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Discuss the characteristics of ECT.
2. Explain the physics of radioactivity.
3. Describe the Biological effects of NMR imaging.
4. Compare short wave and surgical diathermy.
5. Describe the operation of microwave diathermy
6. Explain the function of Kidneys.
7. Discuss the principle of ventilators.
8. Explain the function of automated drug delivery system.
9. Explain AZTEC algorithm.
10. Describe the significance of arrhythmia monitor.

(8 × 5 = 40 marks)

Part B

Answer **one** *question from each module.*

11. (a) Describe the function of radio isotope rectilinear scanner.

Or

(b) Explain in detail the basic blocks of NMR imaging reconstruction technique.

12. (a) Describe the basic principle of High frequency heat therapy and ultrasonic therapy.

Or

(b) Describe in detail the function of artificial kidney.

Turn over

13. (a) Describe the characteristics of Anaesthesia machine in detail.

Or

(b) Explain in detail the Implantable infusion systems with a suitable diagram.

14. (a) Explain the Huffman coding using relevant Diagrams.

Or

(b) Describe the ECG analysis and how it is interpreted.

(4 × 15 = 60 marks)

C 83737 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Applied and Instrumentation Engineering

AI 14 704 E—COMPUTER NETWORKS

Time : Three Hours Maximum : 100 Marks

Part A

I. Answer any *eight* questions out of ten :

1 Describe internetworking connecting devices in reference to layers.

2 Discuss the function performed by of DNS ? Give example.

3 Write short notes about HTTP ?

4 Discuss briefly about the multilevel multiplexing.

5 Compare flow control versus congestion control.

6 Write difference between static and dynamic routing and Explain dijkstra routing algorithm.

7 Give the comparison of unicast, multicast and broadcast routing ?

8 Explain multicast routing protocol DVMRP.

9 Explain in detail about PPP.

10 Enumerate the ARP packet format ?

(8 × 5 = 40 marks)

Part B

II. Answer *all* questions :

11 (a) Explain the challenges faced in building a network. (8 marks)

(b) With a protocol graph, explain the architecture of internet. (7 marks)

Or

12 Discuss the working of E-mail in detail.

13 (a) Explain in detail about the synchronous time division multiplexing. (7 marks)

(b) Explain the three-way handshake protocol to establish the transport level connection. (8 marks)

Or

14 Explain TCP congestion control methods.

15 (a) Explain the function of Routing Information Protocol (RIP). (8 marks)

(b) Draw the IPv6 packet header format. (7 marks)

Or

16 Explain multicast routing in detail.

17 (a) Give a brief note on Wireless application protocol. (7 marks)

(b) PPP (Point to Point Protocol) is based closely on HDLC, which uses bitstuffing to prevent accidental flag bytes within the payload from causing confusion. Give reasons why PPP uses character stuffing instead. (8 marks)

Or

18 What is need for error detection ? Discuss the approaches used for error detection and error correction in networking.

[4 × 15 = 60 marks]

C 83736 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Applied and Instrumentation Engineering

AI 14 703—ANALOG AND DIGITAL MOS CIRCUITS

Time : Three Hours Maximum : 100 Marks

Part A

I. Answer any *eight* questions out of ten. Each question carries 5 marks:

1 Derive the output current equation for current mirror.

2 Derive the voltage gain and output resistance for Common Drain Amplifier.

3 Define the following terms :

(i) Common-mode rejection ratio. (2½ marks)

(ii) Slew rate. (2½ marks)

4 Design a Differentiator using operational amplifier and derive the equation for output voltage.

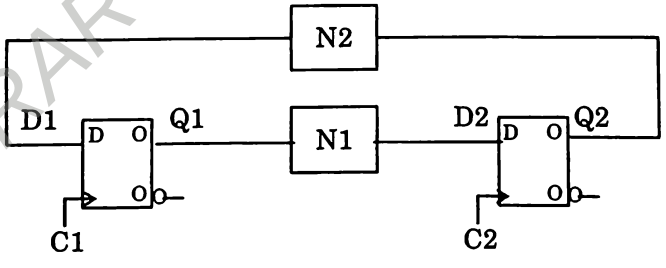
5 Design the Full Adder using the following static CMOS Logic :

(i) Pass transistor. (2½ marks)

(ii) Transmission Gate. (2½ marks)

6 Design a super buffer and 4-stage ring oscillator using CMOS Circuits.

7 (i) What is the minimum clock period for the following circuit as shown in Fig. 1 under the assumption that the clock C2 is skewed after C1 (i.e., C2 is delayed from C1) ?



(3 marks)

Fig. 1

Turn over

(ii) Find setup time and hold time for the input signal LD relative to CLK shown in Fig. 2.

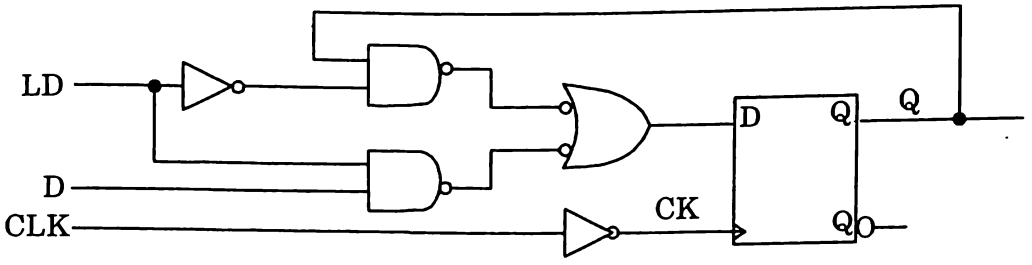


Fig. 2

(2 marks)

8 (i) What is adiabatic logic ? (2 marks)

(ii) How power dissipation is reduced in adiabatic logic circuits. (3 marks)

9 Explain about the voltage biasing of Class AB Amplifier with its I-V characteristics.

10 Explain the BiCMOS logic and find the output voltage for the following circuit.

(8 × 5 = 40 marks)

Part B

II. Answer *all* questions. Each question carries 15 marks :

11 (i) Design a differential amplifier using Operational Amplifier and explain its working. (9 marks)

(ii) Derive the equation of the Gain for the differential amplifier. (6 marks)

Or

12 Explain in detail about the MOSFET I-V characteristics with its different region of operation. (15 marks)

13 (i) Explain the working of sample and hold circuit using operation amplifier. (11 marks)

(ii) Design a voltage follower using operational amplifier. (4 marks)

Or

14 (i) Explain the summing amplifier using operational amplifier. (8 marks)

(ii) Find the output voltage of the following summing amplifier shown in Fig. 3.

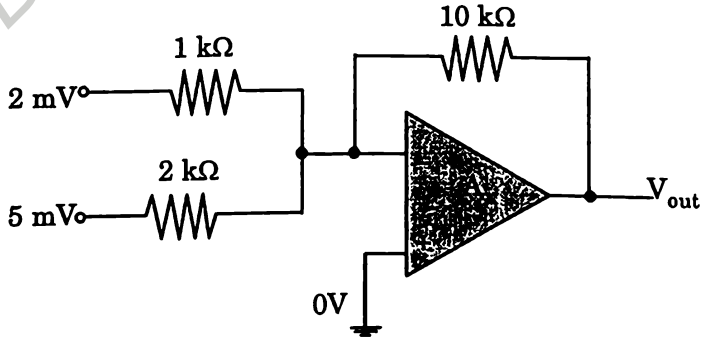


Fig. 3

(7 marks)

15 (i) Draw the voltage transfer characteristic of the Static CMOS inverter and explain the inverter characteristics with its operation.

(11 marks)

(ii) Define AOI, OAI logic with examples. (4 marks)

Or

16 (i) Describe about the Pseudo NMOS logic and construct a NOT, NAND and NOR circuit using this logic.

(8 marks)

(ii) Explain the static and dynamic power dissipation. (7 marks)

17 Explain the NORA, TSPC, CVSL logic types with examples. (15 marks)

Or

18 (i) Explain the charge sharing technique and describe the methods to avoid it ?

(7 marks)

(ii) Draw the structure of Pre charge/Evaluate logic. Describe its working operation with advantages and disadvantages.

(8 marks)

[4 × 15 = 60 marks]

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Aeronautical Engineering

AN 14 703—VIBRATION AND AEROELASTICITY

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

I. 1 Add the following harmonic motions analytically and check the solution graphically :

$x_1 = 3\sin\left(\omega t + 30^\circ\right); x_2 = 4\cos\left(\omega t + 10^\circ\right).$

2 Explain simple harmonic motion.

3 Determine the natural frequency of the simple pendulum (i) Neglecting the mass of the rod ; and (ii) Considering the mass of the rod.

4 Distinguish between free vibration and forced vibration.

5 Determine the natural frequency of the spring - mass - pulley system shown in Fig. 1.

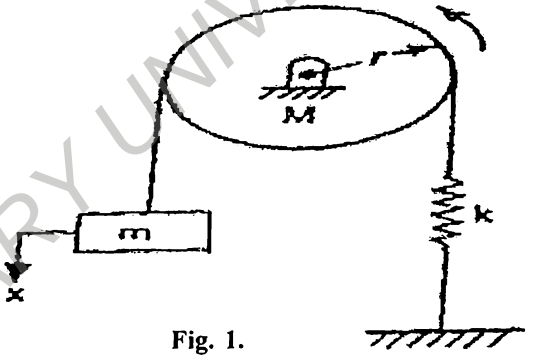


Fig. 1.

6 Define logarithmic decrement.

7 Explain the working of accelerometer.

8 What are principal co-ordinates ? Explain about static and dynamic couplings.

Turn over

9 Determine the equations of motions of the system as shown in the Fig. 2 by using Lagrange's equation.

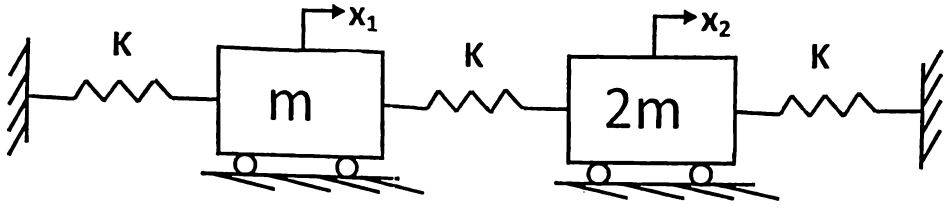


Fig. 2.

10 What is the difference between classical and non-classical flutter ?

(8 × 5 = 40 marks)

Part B

Answer **all the** *questions.*
Each question carries 15 *marks.*

II. 1 A cylinder of radius *r* and mass *m* rolls on a cylinder surface of radius R without slipping. Determine the natural frequency for small oscillation of the cylinder about the lowest point by Energy method.

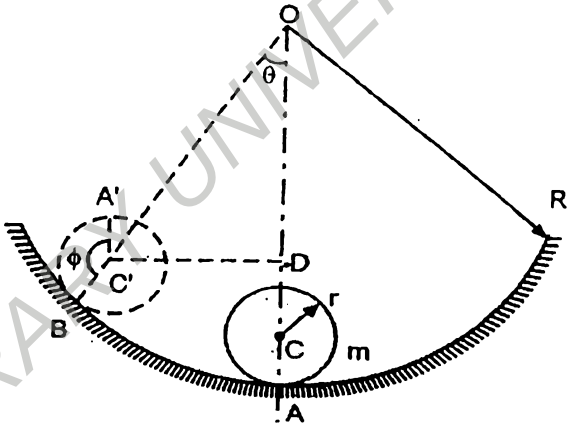


Fig. 3.

Or

2 Derive the expression differential equation of the spring-mass system in vertical position and also find the natural frequency of the system using the following methods :

(i) Newton's method ; (ii) Energy Method ; (iii) Rayleigh's method.

3 A machine of mass one tonne is acted upon by an external force of 2450 N at a frequency of 1500 r.p.m. To reduce the effects of vibration, isolator of rubber having a static deflection of 2 mm under the machine load and an estimated damping £ = 0.2 are used. Determine

(i) The force transmitted to the foundation.

(ii) The amplitude of vibration of machine.

(iii) The phase lag.

Or

4 Derive and obtain the governing differential equation for the damped free vibration of a single degree of freedom system and solve the same for under damping case. Draw the displacement versus time plot and mark the successive amplitudes.

5 Obtain the expression for the natural frequencies of the given system as shown in the Fig. 4, subjected to vibration. Also find the modal vectors and draw the mode shape. Take $m_1 = m$ and $m_2 = 2\,m$. Assume the string is inextensible.

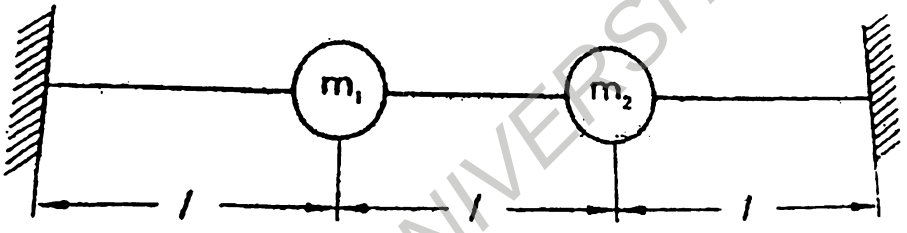


Fig. 4.

Or

6 Derive suitable expression for longitudinal vibrations for rectangular uniform cross-section bar of length, I fixed at one end and free at the other end.

7 Find the lowest natural frequency of transverse vibrations of the system shown in Fig. 5 by Rayleigh's method. Take E = 196 Gpa ; I = 10^{-6} m_4 ; m_1 = 40 kg ; m_2 = 20 kg.

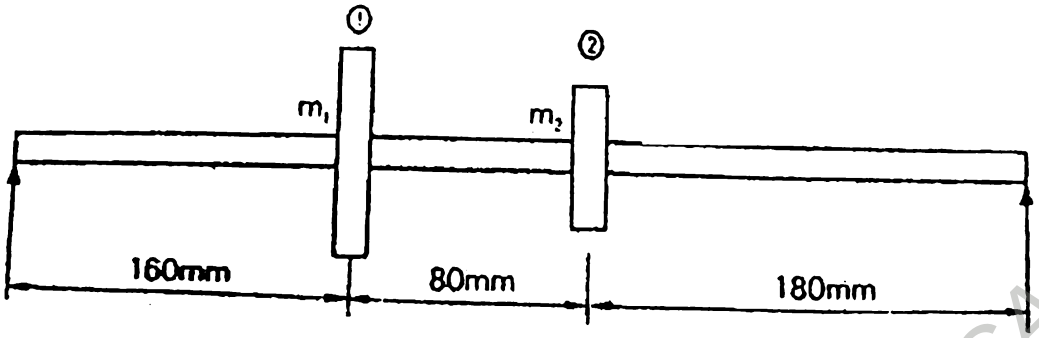


Fig. 5.

Or

8 With the help of Collar's triangle, give an account of the different aeroelastic phenomenon.

(4 × 15 = 60 marks)

C 83733 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] (SUPPLEMENTARY) EXAMINATION, APRIL 2020

Aeronautical Engineering

AN 14 702—COMPOSITE MATERIAL AND STRUCTURES

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. What are the Aircraft Structural Components made of composite materials ? Draw any two structural components.
2. Define Orthotropic Material. What are the material constants of an Orthotropic Material ?
3. Differentiate Micro and Macro Mechanics.
4. What are the assumptions made in Micro Mechanics ?
5. Define :
   (a) Inter Laminar Shear.
   (b) Strength Ratio.
   (c) Matrix.
6. With a neat sketch, distinguish between natural axis and arbitrary axis.
7. Explain angle-ply laminates with neat sketch.
8. What are the three elements in a structural sandwich explain with the neat sketch ?
9. What are the functions and desirable properties of resins ?
10. What are the factors that affect the composite properties ?

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

11. Explain the application of composite materials in aerospace, automotive, and defence industries.

Or

12. Define stiffness and compliance matrix for an anisotropic material and explain how it is transformed to orthotropic, monoclinic materials.

Turn over

13. Obtain an expression for E_1, E_2 and G_{12} in terms of material properties with respect to principal material directions using mechanics of material approach.

Or

14. Explain Hooke's law for a two dimensional unidirectional lamina.

15. A symmetric angle ply laminate has the following data :

4 Layers of each 0.5 mm thick $+45^\circ/-45^\circ/-45^\circ/+45^\circ$. $E_1 = 210$ GPa, $E_t = 21$ GPa, $\mu_{lt} = 0.3$ and $G_{lt} = 7$ GPa.

Compute the in-plane stiffness matrix of the laminate.

Or

16. Write about criterions of composites, with examples.

17. (a) What are the materials used for sandwich construction. (8 marks)

(b) Write short notes on the failure modes of sandwich panels. (7 marks)

Or

18. (a) Explain open and closed mould processes. (5 marks)

(b) Explain with neat sketches one fabrication process under each method. (10 marks)

[4 × 15 = 60 marks]

C 83732 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Aeronautical Engineering

AN 14 701—CONTROL ENGINEERING

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

I. 1 List out the 5 rules to obtain the transfer function of the system using signal flow graph.

2 Write the force-voltage analogy and force-current analogy of a mechanical translational system.

3 What are the advantages and disadvantages of block diagram reduction ?

4 Define rise time, settling time, peak time and peak overshoot.

5 Find the response of a first order system for unit step input.

6 Explain the effect of various inputs on steady state error.

7 Using Routh-Hurwitz criterion check the stability of the system whose characteristic equation is $S^4 + 8S^3 + 18S^2 + 16S + 5 = 0$.

8 Define resonant frequency, gain margin and phase margin.

9 State sampling theorem and explain the sampling process.

10 What is digital PID controller ?

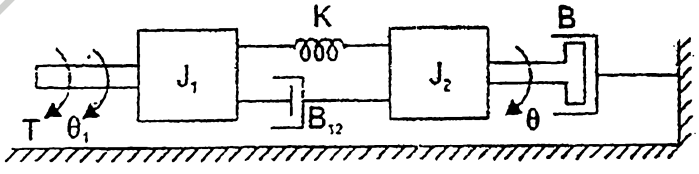
(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

II. 1 (a) Derive the transfer function of a thermal system. (5 marks)

(b) Write the differential equations governing the mechanical rotational system shown in figure. Obtain the transfer function :

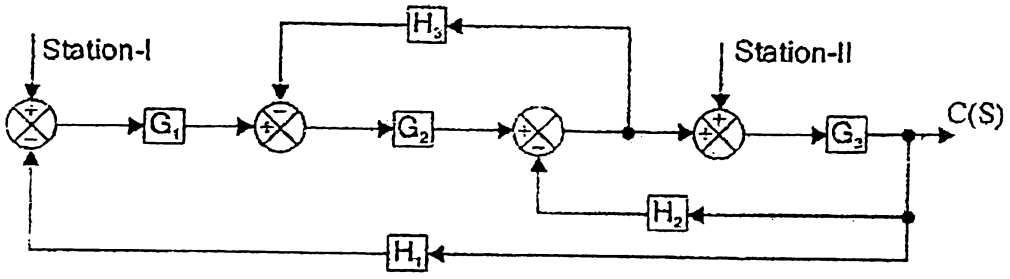


(10 marks)

Or

Turn over

2. Determine the transfer function C(s)/R(s) of the given block diagram :



(15 marks)

3. A unity feedback system is characterized by the open loop transfer function :

$$G(s) = \frac{0.4(s+1)}{s(s+0.6)}.$$

Determine its transient response for unit step input.

Calculate maximum overshoot and peak time.

(15 marks)

Or

4. Derive the expressions for time domain specifications.

5. Sketch the root locus for the unity feedback system whose open loop transfer function is :

$$G(s) = \frac{K}{s\left(s^2+6s+10\right)}.$$

(15 marks)

Or

6. Sketch the bode plot and determine the gain margin and phase margin :

$$G(s) = \frac{75(1+0.2s)}{s\left(s^2+16s+100\right)}.$$

(15 marks)

7. (a) Derive the transfer function of PI, PD and PID controllers. (8 marks)

   (b) Explain the reconstruction of sampled signals using hold circuits. (7 marks)

Or

8. Explain the design of PID controller in frequency domain. (15 marks)

[4 × 15 = 60 marks]

C 83731 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Automobile Engineering

AM 14 704 (E)—COMPUTER INTEGRATED MANUFACTURING

Time : Three Hours Maximum : 100 Marks

Part A

I. Answer any *eight* questions out of ten. Each question carries 5 marks :

1 Describe the general configuration of CNC system.

2 Compare open loop and closed loop system.

3 What are the design considerations of NC machine tools ?

4 List out various disadvantages of manual part programming.

5 Explain point to point programming system.

6 Explain working of post processor technology.

7 Describe bar code technology in detail.

8 Discuss about group technology and list the advantages of Group technology.

9 List the benefits of FMS ?

10 Discuss about robot anatomy and configurations.

(8 × 5 = 40 marks)

Part B

II. Answer *all* questions. Each question carries 15 marks :

11 Discuss the methods of improving machine accuracy and productivity.

Or

12 Discuss the constructional features of NC machine tools with illustrations.

(15 marks)

13 Describe features of incremental and absolute systems with an example.

Or

14 Explain the various tasks in computer assisted part programming.

(15 marks)

Turn over

15 Describe the components, operations and features of automated storage/retrieval systems.

Or

16 Discuss about automatic data capture and optical character recognition.

(15 marks)

17 Explain the different type of robots used in automotive industry and explain their performance capabilities.

Or

18 Explain online and offline robot programming.

(15 marks)

[4 × 15 = 60 marks]

C 83730 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

Automobile Engineering

AM 14 703—OPERATIONS MANAGEMENT

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

I. 1 Discuss the factors affecting the productivity.

2 What do you mean by standardization ? Why should organizations follow standardization ?

3 Distinguish between material requirement planning and manufacturing resource planning.

4 What do you understand by forecasting ? Why it is necessary ?

5 Give short note on fixed, product and process layouts.

6 Analyze aggregate production planning in detail.

7 What do you understand by Therblings ? How they help in motion study ?

8 Write a brief note on the duties and responsibilities of material manager.

9 Discuss the 'condition based maintenance' in detail.

10 What are the reasons for replacement of equipment ?

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 *marks.*

II. 11 Explain various types of production systems used in automobile industry.

Or

12 Develop an adjusted exponential forecast for the 9th week for a firm with the demand shown in Table. 1. Let $\alpha = 0.1$ and $\beta = 0.2$. Begin with a previous average of $F_n = 650$, and let the initial trend adjustment, $T_n = 0$:

Table 1

Week	1	2	3	4	5	6	7	8
Demand	700	685	648	717	713	728	754	762

13 What is meant by method study ? Explain its procedure in detail.

Or

14 Discuss the master production schedule with an example.

15 Describe the purchasing procedure for a medium size industry.

Or

16 Find out the optimum sequence, total elapsed time, total idle time of machine 1 and total idle time of machine 2 for the jobs mentioned in the Table 2 :

Table 2

Jobs		A	B	C	D	E	F	G
Machine 1	:	7	11	9	9	10	12	10
Machine 2	:	10	10	7	16	6	10	15

17 A project consists of the following activities mentioned in Table 3, whose time estimates are given against each as under :

Table 3

	Estimated duration (weeks)		
Activity	Optimistic	Most likely	Pessimistic
1–2	3	6	15
1–3	2	5	14
1–4	6	12	30
2–5	2	5	8
2–6	5	11	17
3–6	3	6	15
4–7	3	9	27
5–7	1	4	7
6–7	4	19	28

Required :

(i) Draw the project network.

(ii) Find the expected duration and variance of each activity.

(iii) Determine the critical path.

(iv) What is the probability that the project will be completed in 38 weeks ?

(v) What project duration will have 95% chance of completion ? (Z0.95 = 1.65)

Given :

Z	0.21	0.41	0.82
∅	0.0832	0.1591	0.2939

(3 + 3 + 3 + 3 + 3 = 15 marks)

Or

18 Explain the following :

(a) Preventive maintenance.

(b) Break-down maintenance.

(7.5 + 7.5 = 15 marks)

[4 × 15 = 60 marks]

C 83728 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] {SUPPLEMENTARY} EXAMINATION, APRIL 2020

- Automobile Engineering

AM 14 701—VEHICLE ELECTRIFICATION

Time : Three Hours Maximum : 100 Marks

Part A

I. Answer any *eight* questions out of ten. Each question carries 5 marks :

1 Discuss about any two methods for charging an automobile battery.

2 Explain in detail how temperature affects specific gravity and battery capacity.

3 Discuss about the new developments in electrical storage batteries.

4 Explain how bridge rectifier works in a charging system.

5 What is the necessity of cut-out relay in a charging system ?

6 With a neat diagram explain standard Bendix drive mechanism.

7 Explain different types of starter motor.

8 Write a short note on different type of spark plugs used in petrol engines.

9 What are the limitations of ignition coil system ? Explain in detail about the merits of electronic ignition system.

10 Explain centrifugal and vacuum advance mechanisms used in ignition systems.

(8 × 5 = 40 marks)

Part B

II. Answer *all* questions. Each question carries 15 marks :

11 (a) With a neat sketch, explain the construction and working of a lead acid battery. (10 marks)

(b) Discuss about any two methods for battery rating. (5 marks)

Or

12 (a) Discuss in detail about different methods available for testing a battery. (12 marks)

(b) Enumerate the factors which affect the battery life. (3 marks)

13 (a) With a neat sketch, explain the working of three-phase alternator in automobiles. (10 marks)

(b) Explain the concept of third brush regulation in DC generator. (5 marks)

Or

Turn over

14 (a) With neat sketches, explain the working of voltage and current regulators used in an automotive charging system.

(10 marks)

(b) Discuss any five trouble shoots associated with automotive charging system.

(5 marks)

15 (a) With neat sketches, explain about different types of drives and starter switches available for series motor.

(10 marks)

(b) Explain the different characteristics of D.C. series motor. (5 marks)

Or

16 (a) Give the constructional details and working of a starter switch and solenoid.

(10 marks)

(b) Discuss some of the troubles faced by starter and their probable reasons. (5 marks)

17 (a) With a neat sketch, explain how does a battery ignition system works. (12 marks)

(b) What is dwell angle ? What is its significance ? (3 marks)

Or

18 (a) Explain the working of a capacitive discharge ignition system with neat diagram.

(12 marks)

(b) What is the necessity of ignition timing in an S.I. engine ? (3 marks)

[4 × 15 = 60 marks]

C 83727 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Mechatronics Engineering

MT 09 705 (B)—COMPUTER INTEGRATED MANUFACTURING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1 List the basic components of NC system ?

2 What are all the steps required to use NC Machines ?

3 List the four ways to prepare the part program.

4 Define Navigation.

5 Define FMS.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6 Classify the NC Machine tools.

7 Explain about Basic Motion control.

8 Explain about manual part programming.

9 Describe about point to point programming.

10 Compare the Navigation and Guidance.

11 What are the major elements of FMS.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (a) Describe the types of NC machine tools.

Or

(b) Describe any *two* special tool holders with neat sketch.

13. (a) Write a program with procedure to perform facing of 3 mm in a 25 mm diameter rod.

Or

(b) Explain with clear example about word address format.

14. (a) Explain about the features of AGV.

Or

(b) Explain about multiclass coding system.

15. (a) Briefly explain about FMS.

Or

(b) Explain detail about material handling system.

(4 × 10 = 40 marks)

C 83726 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Mechatronics Engineering

MT 09 704—ARTIFICIAL INTELLIGENCE

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. What is artificial Intelligence ?
2. Define generalized modus ponens.
3. What is entailment ?
4. Give the building blocks of LISP.
5. How to define macro in LISP ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Describe about utility based agent.
7. Explain depth first search algorithm with an example.
8. Specify the issues in knowledge representation.
9. Discuss the process of genetic programming.
10. Write short notes on lambda expressions.
11. Write a LISP program to concatenate the lists.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. A) Describe constraint satisfaction procedure with map coloring example.

Or

B) What are the problems encountered during hill climbing and what are the ways available to deal with these problems ?

Turn over

13. A) Write the algorithm for propositional resolution and unification.

Or

B) Explain alpha beta pruning algorithm in detail.

14. A) Discuss in detail about Bayes networks.

Or

B) Describe forward chaining with suitable example.

15. A) How to represent two dimensional arrays in LISP ? Write a program to multiply the given matrix.

Or

B) What are the functions for processing strings in LISP ? Write a program to check whether the given character in the string.

(4 × 10 = 40 marks)

C 83725 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Mechatronics Engineering

MT 09 703—DIGITAL SIGNAL PROCESSING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

Each question carries 2 *marks.*

1. Compare Radix 2 DIT, DIF FFT algorithm.
2. What is known as prewarping ?
3. What are the properties of bilinear transformation ?
4. What is meant by adaptive filter ?
5. List the advantages of floating pint representation.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

Each question carries 5 *marks.*

1. What is the difference between energy and power signal ?
2. Why the ROC of Z-transform can not contain any pole ?
3. Give the various steps involved in the design of FIR filter.
4. Give the advantages of digital filter over analog filter.
5. What is the function of accumulator unit in DSP processor ?
6. What are the advantages of representing the digital filter in the block diagram form ?

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*

Each question carries 10 *marks.*

1. a) What is meant by aliasing ? How can it be avoided ?

Or

b) Give the graphical and mathematical representation of CT and DT unit impulse, unit step and unit ramp function.

Turn over

2. a) Compute 4 point DFT of a sequence xn) = {0 1 2 3} using DIF and DIT algorithms.

Or

b) State and prove any two properties of DFT and perform convolution of following sequences $X_1(n)$ = {l 1 2 1}; $X_2(n)$ = {1 1 2 1}

3. a) Apply bilinear transformation to $H(s) = \frac{2}{(s+1)(s+2)}$ with T1 sec and find H(z).

Or

b) The system function of analog filter is as given

$$H_a(s) = \frac{s+0.1}{(s+0.1)^2+9}$$

Obtain the system function of IIR digital filter using impulse invariance method.

4. a) Compare the truncation and rounding errors using fixed point and floating point representation.

Or

b) Represent the following numbers in floating point format with five bits for mantissa and three bits for exponent.

(a) 7_{10}

(b) 0.25_{10}

(c) -7_{10}

(d) -0.25_{10}

(4 × 10 = 40 marks)

C 83723 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Mechatronics Engineering

MT 09 701—DESIGN OF MACHINE ELEMENTS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. What is meant by design for X ?
2. What is flexible couplings ?
3. List the advantage of spur gears.
4. Integrate the common profiles used for gear tooth.
5. List the advantage of flat belt drive.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

1. Explain the factor of safety.
2. Discuss the critical speed of a shaft.
3. Write some applications of bevel gear drive.
4. A helical gear has a normal pressure angle of 30 degree, a helix angle of 30 degree, normal module of 5mm and gas 30 teeth. Find the pitch diameter.
5. Describe virtual number of teeth in helical gear.
6. Design a flat belt drive to transmit 20 kW at 720 r.p.m. The center distance is 3 m and the speed ratio is 3. Diameter of rolling pulley is 1.2 m.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

1. a) Discuss the design procedure for developing a new product.

Or

b) Discuss the important properties of material in machine design.

2. a) Describe the procedure for designing a sleeve coupling.

Or

b) Describe the procedure for designing a flange coupling

3. a) Design a spur gear drive for a heavy machine tool with moderate shocks. The pinion is transmitting 18 KW at 1200 r.p.m. with a gear ratio of 3.5. Design the drive and check for elastic stress and plastic deformation. Make a sketch and label important dimensions arrived.

Or

b) Design a helical gear to transmit 15 KW at 1440 r.p.m. to the following specification. Speed reduction is 3, Pressure angle is 200 and helix angle is 15 degree. The material for both the gears is C45 steel. Allowable static stress is 180 N/mm^2, Surface endurance limit is 800 N/mm^2 and Young's Modulus of material is 2×10^5 N/mm^2.

4. a) Design a V-belt drive and calculate the actual belt tension and average stress for the following data. Driven pulley diameter, D = 500 mm, driver pulley diameter, d = 150 mm, center distance C = 925 mm, speed n_1 = 1000 r.p.m., n_2 = 300 r.p.m. and power, P = 7.5kW.

Or

b) A roller chain drive is used between a driver shaft running at 1440 r.p.m. and a driven shaft running approximately at 720 r.p.m. The power transmitted is 15KW. The drive is to be used for 2 shifts/day with 8hours/shift. The center distance is approximately 1000 mm and the chain tension can be adjusted by moving the motor in the rails. Design the drive.

(4 × 10 = 40 marks)

C 83722 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Production Engineering

PE 09 706 L23—TOTAL QUALITY MANAGEMENT

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

Each question carries 2 *marks.*

1. One way of defining quality is 'delighting the customer'. What does this definition of quality imply ?
2. Differentiate the terms 'goals' and 'targets'.
3. Indicate any *two* internal sources of benchmarking.
4. The data on the 'time to failure' of *five* units of a capacitor is present below :

Capacitor number		*Time to failure in hours*
1	...	500
2	...	550
3	...	450
4	...	600
5	...	400

Using the above data, determine the Mean Time To Failure (MTTF) of all the five units of the capacitor.

5. A survey was conducted among 40 respondents to find the satisfaction of the customer. A grading scale of 1 to 5 was used. In this scale, '1' indicated that the customer was least satisfied, while '5' indicated that the customer was highly satisfied. The data gathered by conducting this survey are presented below :

Grading		*Number of respondents*
1		3
2	...	2
3	...	3
4	...	8
5	...	8

Using the above data, determine the co-efficient of variation of the customer satisfaction.

(5 × 2 = 10 marks)

Turn over

Part B

Answer any **four** *out of six.*
Each question carries 5 *marks.*

6. With the aid of a block diagram, describe about the external customers of an educational institution.
7. Write any *four* definitions of Total Quality Management' (TQM).
8. Draw and briefly describe about strategic grid.
9. Briefly describe the characteristics of the four types of customers considered while implementing 'customer focus' in manufacturing organizations.
10. What are the six big losses considered while implementing Total Productive Maintenance (TPM) in organizations ?
11. What are the documents to be prepared while pursuing QS 9000 Certification in an automobile components manufacturing company ?

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (a) What are the characteristics of vision of an organization ? What are the characteristics that should be reflected in the vision statement of an educational institution ?

Or

(b) With the aid of a triangular block diagram, describe about integrated TQM model.

13. (a) Draw a sample affinity diagram and describe the steps followed to prepare it.

Or

(b) Explain in detail about 'Customer Satisfaction Measurement' (CSM).

14. (a) What are the actions to be executed by the Chief Executive Officer (CEO) for effectively implementing quality circle philosophy in an organization ? What are the advantages of implementing quality circle philosophy in an organization ?

Or

(b) Describe about Weibull hazard model.

15. (a) How is 'Cost of Poor Quality' (CPQ) calculated ? What are the costs considered while calculating CPQ ?

Or

(b) Describe any *five* types of quality audits.

(4 × 10 = 40 marks)

C 83718 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Aeronautical Engineering

AN 09 703—WORKSHOP TECHNOLOGY

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

Each question carries 2 *marks.*

1. List any *four* hot working processes.
2. What is recrystalisation ?
3. List the types of forge or pressure welding.
4. List four non precision instruments for angular measurement.
5. What is Fullering ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

Each question carries 5 *marks.*

6. List five demerits of hot working process.
7. Explain temporary and permanent jamming in a cupola furnace.
8. List and explain the different types of gas flames used for welding and mention their inner core temperature.
9. List the advantages and disadvantages of laser beam welding.
10. Explain the principle and operation of surface grinding machine.
11. List the advantages and disadvantages of mechanical comparators.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*

Each question carries 10 *marks.*

12. Compare ten aspects of hot working with cold working process.

Or

13. Explain any *five* measuring tools used in a fitting shop with neat sketches.

14. Explain any *five* types of welding joints with neat sketches.

Or

15. Explain brazing process and its types in detail.

16. Explain the construction and working of a shaping machine with a sketch.

Or

17. Explain the principle and working of a planning machine with a sketch.

18. Explain the construction and working of an outside micrometer with a sketch along with the procedure for reading measurements.

Or

19. Explain Vernier height gauge with a neat sketch and differentiate Vernier depth gauge and Vernier height gauge by indicating the graduations in it.

(4 × 10 = 40 marks)

C 83717 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Aeronautical Engineering

AN 09 702—AVIONICS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Give few examples of integrated avionics system used in civil airlines.
2. Define the usage of avionics in space systems.
3. What is a volatile memory and give examples ?
4. Define plasma panel.
5. What is navigation system and explain the various types of navigation with examples.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Explain the advantage of using avionics in military aircraft.
7. Explain the need for standard documents in the design of avionics system.
8. Enlist the major drivers for avionics in civil transport aircraft ? Explain any *one* in detail.
9. How is federated architecture different from centralized architecture ?
10. Explain ARINC 429 standard.
11. Explain CRT and its usage in aircraft displays.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (a) Explain clearly the top down design procedure that is adopted in Avionics system design.

Or

(b) Explain the various layers of Avionics systems used in a typical airplane with a neat sketch.

13. (a) Explain the bus controller and Remote terminal of MIL-STD 1553B.

Or

(b) Describe in detail about one of the third generation Avionics Architecture with block schematics.

14. (a) Explain MIL STD 1553 B data bus in detail bring out clearly the bus architecture, protocol, word ad message formats and coupling methods.

Or

(b) Explain the basic principle of HUD and what are its limitations ? How are they overcome in HMD ?

15. (a) Explain the need of communication system in airline. List the advantage and dis advantage of the communication system in an airline.

Or

(b) Explain Conventional Flight control system and advantage of FBW to overcome the disadvantage of Conventional FCS.

(4 × 10 = 40 marks)

C 83716 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Aeronautical Engineering

AN 09 701—PROPULSION–II

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

Each question carries 2 *marks.*

1. Give the relation for efficiency of turbines in which the exhaust energy is not utilized.
2. What are the three distinct operating condition of a ramjet engine ?
3. Differentiate under and over expanded nozzles.
4. What are perforations ?
5. Define grain configuration.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

Each question carries 5 *marks.*

6. Explain how operating temperature acts as a limiting factor in gas turbine design.
7. Discuss the advantages and disadvantages of scramjets.
8. Explain the significance of thrust and thrust coefficient in rocket propulsion with a figure.
9. Explain supersonic combustion in a ramjet.
10. Explain the concept of nozzleless propulsion along with the properties required for an ideal propellant for nozzleless configuration.
11. List five advantages and five disadvantages of solid propellant rocket.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. In a single-stage turbine designed on free vortex theory the following parameters are given :

Mass flow through turbine	=	18 kg/s
Inlet total head temperature	=	1000 K
Inlet total head pressure	=	4 kgf/cm^2
Axial velocity at nozzle exit	=	260 m/s
Blade speed at mean diameter	=	305 m/s
Nozzle angle at mean diameter	=	25°
Ratio of tip to root radius	=	1.4

The gas leaves the stage in an axial direction. Assuming that all the nozzle loss amounts to 4 per cent of the isentropic heat drop across the nozzle, find :

(a) the total throat area of the nozzle ;

(b) the nozzle efflux angle at root and tip ;

(c) the static pressure after nozzle at root and tip ;

(d) the gas inlet angles at root and tip the blades ;

(e) the rate of work done on the turbine blades in hp

Assume a mean specific heat at constant pressure of 0.274 throughout the cycle.

Or

13. Explain internal air cooling of turbine blades with sketches.

14. Discuss the considerations involved in designing a ramjet.

Or

15. Explain the salient features of a ramjet.

16. Explain combustion instability in hybrid rockets with graphs.

Or

17. The following measurements were made in a sea level test of a solid propellant rocket motor :

Burn duration	=	40 sec
Initial mass before test	=	1210 kg
Mass of rocket motor after test	=	215 kg
Average thrust	=	62,250 N
Chamber pressure	=	7.00 MPa
Nozzle exit pressure	=	0.070 MPa
Nozzle throat diameter	=	0.855 m
Nozzle exit diameter	=	0.2703 m

Determine mass flow rate, actual exhaust velocity, characteristic velocity at sea level, and c and I_{sp} at 1000 and 25,000 m altitude. Assume an invariant thrust and mass flow rate and negligible short start and stop transients.

18. Explain the methods of thrust augmentation.

Or

19. Explain the principle and working of a solar sail in detail.

(4 × 10 = 40 marks)

C 83713 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Applied Electronics and Instrumentation Engineering

AI 09 705 L11—COMPUTER NETWORKS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. What are the features of HTTP ?
2. Define the role of application layer.
3. State the need for multiplexing signals.
4. Define Internetworking.
5. Mention the different types of error detection techniques used in data communications.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Write short notes on E-mail system with neat diagram.
7. Discuss about the features of TCP.
8. Distinguish between IPv4 and IPv6 addresses.
9. Discuss circuit switching in detail.
10. Explain in detail about the ATM technology with neat sketches.
11. What is UDP checksum ? Explain with one example.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (a) Write-notes on DNS and FTP.

Or

(b) Explain the delays and loss in packet-switched networks.

Turn over

13. (a) Explain UDP protocol at transport layer.

Or

(b) With neat sketches, explain in detail about the slow start in TCP congestion control.

14. (a) Elaborate on internet protocols.

Or

(b) Explain in detail about Distance Vector Multicast Routing Protocol (DVMRP) with neat diagrams.

15. (a) Define a Bridge. Explain the working of Bridges in detail.

Or

(b) Explain any two algorithms used to ensure secured data in networks.

(4 × 10 = 40 marks)

C 83712 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Applied Electronics and Instrumentation Engineering

AI 09 704—ANALOG AND DIGITAL CIRCUIT DESIGN

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Draw the MOS I/V characteristics.
2. What is a current mirror ?
3. Define a COMS switch.
4. Define report statement.
5. How is PLA implemented in VHDL ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Write short notes on MOS load.
7. Choose values of VGS = 1, 2, 3, 4 and 5 V, assume that the channel modulation parameter is zero. Sketch to scale the output characteristics of an enhancement *n*-channel device if VT = 0.7 V and ID = 500 μA when VGS = 5 V in saturation.
8. What are the limitations on the performance of op-amp circuits at large output signals ?
9. Write a VHDL program for implementing a KJ flip flop.
10. Write the trends in hardware description language.
11. Explain the declaration of constant, variable and signal in VHDL using examples.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. Characterize the common source single stage amplifier with and without source degeneration circuit by deriving the amplifier parameters.

Or

13. Briefly explain the differential amplifiers. With necessary equation give the large signal analysis of CMOS differential amplifiers.

14. Explain the different amplifier topologies describing feedback circuits.

Or

15. With neat diagrams, explain in detail coscode op-amps.

16. With examples discuss the different types of architectural modeling.

Or

17. With examples, describe the different types of loop statements in VHDL.

18. Write down the truth table, entity declaration and behavioural/dataflow architecture for the Decoder. Also draw the circuit and output waveforms.

Or

19. Write a VHDL program for 4 bit full adder with carry in behavioral description.

(4 × 10 = 40 marks)

C 83711 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Applied Electronics and Instrumentation Engineering

AI 09 703—ELECTRONIC COMMUNICATION SYSTEMS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Write the generating methods of SSB-SC signal.
2. Describe a transmission line.
3. What is a super heterodyne receiver ?
4. What are the advantages of satellite communication ?
5. Define microwave communication.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Explain the generation of PM using frequency modulator.
7. Find the bandwidth of a commercial FM transmitter assuming-frequency deviation Δf = 75 kHz and bandwidth of modulating signal $x(t)$, for fm = 15 kHz.
8. Write short notes on M-ary PSK.
9. Discuss the modulating principle of BPSK.
10. Explain optical fibre link.
11. Explain the disadvantages of delta modulation.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. Draw the block diagram of a communication system and explain the functions of each block.

Or

13. Compare the features and characteristics of AM, FM and PM.

14. What is a demodulator ? Explain with neat block diagram the functioning of an AM demodulator circuit.

Or

15. What is pulse modulation ? Explain its types with neat schematics.

16. What do you mean by multiplexing ? With the help of a schematic block diagram, explain frequency division multiplexing.

Or

17. Obtain an expression for signal to quantization noise power ratio in the case of PCM. Assume that the amplitude of the signal is uniformly distributed.

18. Explain in detail how analog and digital techniques are used in telecontrol.

Or

19. Draw the functional block diagram of a telemetry system and explain its working.

(4 × 10 = 40 marks)

C 83709 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Applied Electronics and Instrumentation Engineering

AN 09 701—PROCESS CONTROL INSTRUMENTATION

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

Each question carries 2 *marks.*

1. Describe how the process inputs are classified.
2. Define STEP input.
3. Draw the functionality diagram of valve with positioner.
4. Define process identification.
5. Enlist the PLC instructions for arithmetic operations.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

Each question carries 5 *marks.*

6. Describe how three ramp inputs can be combined to form a triangular pulse.
7. Derive the step response of first order systems.
8. Describe the general guidelines for valve selection.
9. Describe the types of positioners.
10. Explain the block diagram of relay based approach in process identification.
11. Describe the operation of Analog control using PLC.

(4 × 5 = 20 marks)

Part C

Answer Section (a) **Or** (b) *questions.*
Each question carries 10 *marks.*

12. (a) Derive necessary equation to show the response of First-order process to a Sinusoidal input.

Or

(b) Derive the step response of Second order systems with damping ratio greater than one.

13. (a) Describe the function of Electric Actuators with neat illustration.

Or

(b) Explain the functioning strategy of P/I converter.

14. (a) Describe the steps involved in fitting a first order with dead time model.

Or

(b) Describe the Multivariable control using relevant examples.

15. (a) Describe the Data transfer instructions in PLC.

Or

(b) Describe the processor, processor scan and memory types of PLC.

(4 × 10 = 40 marks)

C 83708 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Printing Technology Engineering

PT 09 702—ELECTRICAL DRIVES AND CONTROLS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Draw the turn-off characteristics of an SCR.
2. Briefly discuss the V-I characteristics of SCR.
3. State the advantages of a group drive.
4. Why starter is needed for d.c. motors ?
5. What is v/f control in three phase induction motor ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Give the constructional details and switching characteristics of a power MOSFET.
7. What are the reasons for using load equalization in an electrical drive.
8. Explain the components of load torques and draw the characteristics of the variation of friction torque with speed ?
9. What are the advantages and disadvantages of load commutated dc chopper.
10. Why stator voltage control is an inefficient method of induction motor speed control ?
11. Explain the different variable speed drives in synchronous motor.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. a) Mention and explain the various methods of turn ON of an SCR.

Or

b) Give the constructional details and switching characteristics of a power MOSFET.

13. a) What are the advantages of dual converters in electric drives ?

Or

b) Explain the process of load equalization.

14. a) Explain multi quadrant operation of d.c. separately excited motor fed from fully-controlled rectifier.

Or

b) With the help of relevant torque-speed characteristics, discuss different methods of braking of D.C. shunt motor.

15. a) Explain the operation of self-controlled synchronous motor drive employing load commutated thyristor inverter.

Or

b) Explain how the acceleration time and energy losses are calculated during starting of a three phase induction motor.

(4 × 10 = 40 marks)

C 83707 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Mechanical Engineering

ME 09 706 L25—ENERGY ENGINEERING AND MANAGEMENT

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. What is meant by global warming ?
2. List the various energy conservation schemes in INDIA.
3. Define energy index.
4. List the advantage and disadvantage of wind energy collectors.
5. List some of the energy resource management.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Illustrate Energy Scenario of India.
7. Explain the trends and pattern of Energy Consumption in India.
8. List Direct and in Direct methods for Evaluating Boiler Efficiencies.
9. Explain the potential of solar heat in the future energy system.
10. Illustrate the role of Renewable energy Certification (REC) mechanism.
11. Write a short note on cost optimization.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. Explain the Challenges and opportunities for Non Conventional Energy in Indian perspective.

Or

13. Identify the need for public awareness on environment management. Discuss the effort of important institutions and people in the environment.

Turn over

14. Explain the methodology and steps of detailed energy audit with special reference to a power plant.

Or

15. List the different types of thermal energy storage systems. Explain any two of them in detail.

16. Explain methods for conservation of energy in water pumping installations.

Or

17. Explain how Water Heat Recovery System can improve your home energy costs.

18. Explain different Energy Efficiency Improvement and Cost Saving techniques for a Petrochemical Industry and a Sugar Industry.

Or

19. Explain financial appraisal and profitability in energy auditing.

(4 × 10 = 40 marks)

C 83706 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Mechanical Engineering

ME 09 705 L23—INDUSTRIAL SAFETY ENGINEERING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. What is industrial safety ?
2. What is a fire triangle ? What are its elements ?
3. List out the variation of MTBF.
4. What is consequence analysis ?
5. What is failure rate ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Discuss about unsafe condition.
7. Sketch and explain any *two* types of portable fire extinguishers.
8. Explain the concept of industrial hygiene.
9. Write a note on Threshold limit values.
10. What is the major toxic release in to atmosphere ? Explain the methods to prevent and reduce these releases.
11. What is meant by hazard function ? Explain.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*

Each question carries 10 *marks.*

12. (a) Discuss the nature and causes of accidents.

Or

(b) Describe the types of industrial hazards-nature, causes and control measures.

13. (a) Describe the personal fire protective equipments, its need and selection criteria.

Or

(b) Discuss the various electrical hazards in industries and the electrical safety devices used.

14. (a) Discuss about emergency planning and preparedness in detail.

Or

(b) With a neat sketch explain function of gravitational settling chambers.

15. (a) What is meant by operational reliability ? Explain the process of reliability operational assessment.

Or

(b) Explain about exponential - normal - lognormal distributions.

(4 × 10 = 40 marks)

C 83705 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Mechanical Engineering

ME/PTME 09 706 L21—LOGISTICS AND SUPPLY CHAIN MANAGEMENT

Time : Three Hours Maximum : 70 Marks

Part A

All questions *are* compulsory.

1. List any *four* major obstacles categorised to take suitable action in order to enable effective co-ordination in a supply chain.
2. What is supply chain management ?
3. Identify the key factors to be considered when designing a distribution network.
4. How to analyse demand forecasts to estimate forecast error ?
5. What are the trade-offs that shippers need to consider when designing a transportation network ?

(5 × 2 = 10 marks)

Part B

Answer **four** *questions out of six.*

6. Discuss about the significance of supply chain decision making framework.
7. Write short note on the role of forecasting for both an enterprise and a supply chain.
8. Illustrate the functions of logistics system.
9. Describe trade-offs that must be considered when making revenue management decisions.
10. Explain four functions of inventory.
11. Discuss the role of each driver in creating strategic fit between the supply chain strategy and the competitive strategy.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*

12. (a) Explain in detail about the decision phases in a supply chain.

Or

(b) Explain in detail about four process cycles of supply chain.

13. (a) Elucidate in detail about the role of safety inventory in a supply chain.

Or

(b) Explain in detail about time horizon for forecasting.

14. (a) Elaborate in detail about the role of IT in supply chain.

Or

(b) Explain in detail about supplier sourcing and assessment factor.

15. (a) Illustrate in detail about the factors Influencing distribution network design.

Or

(b) Describe about various factors affecting transportation decisions and various transportation modes.

(4 × 10 = 40 marks)

C 83704 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Mechanical Engineering

ME 09 706 L14—DESIGN OF JIGS AND FIXTURES

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. What is meant by locating ?
2. What are the basic rules for applying clamping forces ?
3. List out the different types of drilling bushes.
4. What is the purpose of providing area relief below the workpiece ?
5. Describe the application of vacuum chucks.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Describe in detail about diamond pin locator used in fixtures.
7. Schematically represent the use of swing clamps.
8. Brief the various elements of drilling jig.
9. With aid simple sketch, show the advantages of double leaf drill jig.
10. Discuss the construction of face plate turning fixture.
11. Describe the use of modular fixture by simple sketches.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (a) Explain the 3-2-1 principle of location with aid of neat sketch.

Or

(b) Enumerate the functions of cylindrical, spherical, conical and nest locators by neat sketches.

Turn over

13. (a) Explain the working of following clamps with neat sketches :

(i) Strap clamp ; (ii) Latch clamp ; (iii) Wedge clamps ; and (iv) Two way clamp.

Or

(b) Explain the working and advantages of hydraulic and pneumatic clamping devices.

14. (a) Design a drilling jig for use when machining 30 mm diameter hole in the Bracket shown in Fig .3. The component is complete except for this hole.

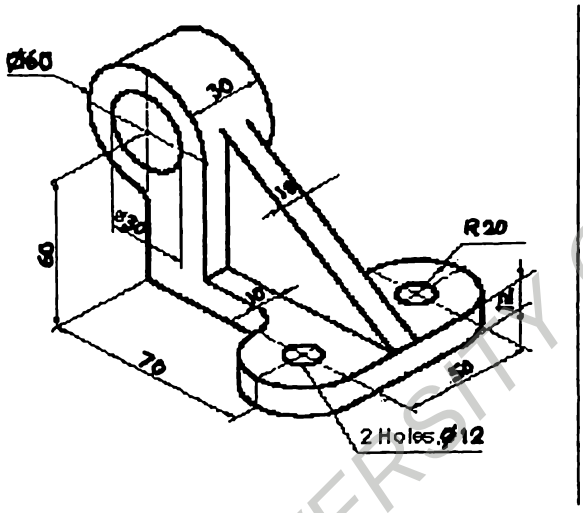


Fig.1

Or

(b) Draw the box type drill jig for making the three holes (one in top surface and two holes in side surface) are located in the part as shown in Fig.2.

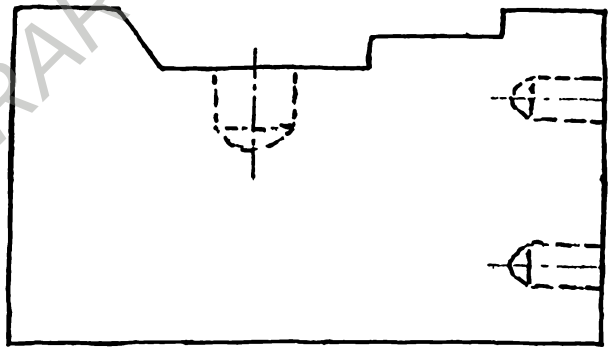


Fig.2

15. (a) Explain the application of machine vices and mandrels in fixtures with suitable sketch.

Or

(b) Design a string milling fixture to mill a slot 2 mm wide X 2 mm deep in the head of the special bolt shown in Fig.3. Five work pieces are to be milled at a time.

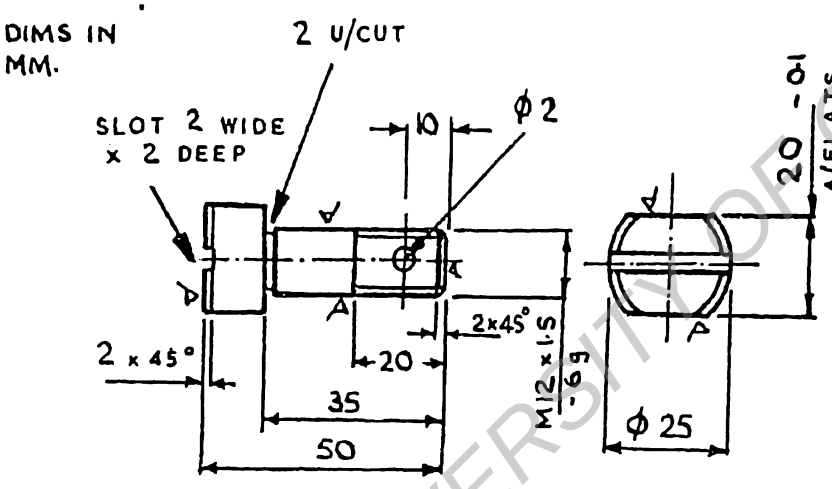


Fig.3

(4 × 10 = 40 marks)

C 83703 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Mechanical Engineering

ME/PTME 09 705 L07—AUTOMOBILE ENGINEERING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. What is the significance of all wheel device ?
2. Explain the working principle of fuel filter in petrol engine.
3. Define : Fluid Coupling.
4. Give an application of multi-plate clutch and justify its usage in that application.
5. Define neutral steer and over steer.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Describe briefly the different types of chassis frame.
7. Mention any major functions of engine lubricating oil.
8. How are the constant mesh transmissions arranged for obtaining torque changes ? Discuss the advantages of constant mesh over sliding mesh type.
9. Describe the working principle of Air Brake.
10. State the advantages of MacPherson system.
11. Describe any two types of rear axles with neat sketches.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (a) Describe briefly the constructional details of engine components and also brief about the significance on it.

Or

(b) Describe the types of valves and valve seats with neat sketches.

13. (a) Explain construction and working of common rail diesel injection system. List the merits and demerits.

Or

(b) Elucidate the principle, construction and working of water cooling system with neat sketches.

14. (a) How the synchromesh mesh gear box is different from sliding mesh gear box ? State and describe the construction and working of synchromesh gear box with power flow configurations.

Or

(b) What is meant by Antilock Braking System (ABS) ? Explain the construction, working principle and significance of ABS with various components.

15. (a) Explain the construction and working of unequal wishbone suspension system with its significance.

Or

(b) Explicate the construction of a conventional pneumatic tyre along with desirable properties of a tyre.

(4 × 10 = 40 marks)

C 83702 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Mechanical Engineering

ME/PTME 09 704—POWER PLANT ENGINEERING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*
Each question carries 2 *marks.*

1. Define : Cogeneration.
2. Differentiate between open and closed feed water heaters.
3. How the rating of boiler has carried ?
4. List any *four* boiler inspection procedures ?
5. Define : Gas cooled reactor.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Explain with a neat sketch the working of binary vapour cycle ?
7. Draw the T-S diagram for Gas turbine with reheater and indicate all the process in T-S diagram.
8. Briefly explain the functions of economizer and super heater on steam power plant.
9. What are the various boiler accessories ?
10. List out the various components and its function on nuclear power plants.
11. Differentiate between pressurized water reactor and boiling water reactor.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (a) The steam at 36 bar and 350°C is supplied to a steam power plant working on a single stage regenerative cycle. The condenser pressure is 0.2 bar and the steam is bled at 5 bar. Calculate the regenerative cycle efficiency and compare it with that of Rankine cycle.

Or

Turn over

(b) A gas turbine power plant consists of a two stage compressor with inter-cooling and a single stage turbine with a regenerator. Air enters the compressor at 1 bar, 20°C. The maximum temperature of the cycle is limited to 900°C and the maximum pressure ratio is 6. The effectiveness of the regenerator is 0.7. The rate of air flow through the plant is 210 kg./s and the calorific value of fuel used is 40.8 MJ/kg. The isentropic efficiency of both the compressors is 0.82, the isentropic efficiency of the turbine 0.92, the combustion efficiency is 0.95, the mechanical efficiency is 0.96 and the generator efficiency is 0.95. Take for air cp = 1.005 kJ/kg. K and y = 1.4 and for gases cp = 1.08 kJ/kg. K and γ = 1.33. Assuming perfect inter-cooling and neglecting pressure and heat losses, estimate (a) Air-fuel ratio ; (b) Cycle efficiency ; (c) Power supplied by the plant ; and (d) Specific fuel consumption of the plant and the fuel consumption per hour.

13. (a) Explain briefly about the steam power plant with a neat sketch? List the advantages and disadvantages ?

Or

(b) Explain the working of forced draught and induced draught cooling towers with neat sketches.

14. (a) In a steam nozzle, dry and saturated steam is expanded from 10 bar to 0.1 bar. Using the steam tables calculate (i) Dryness fraction of steam at exit, (ii) Heat drop; (iii) The velocity of steam at exit from the nozzle when the initial velocity is 135 m/s.

Or

(b) Describe various types of condensers with neat sketches.

15. (a) Explain the basic principles of MHD with sketch.

Or

(b) A power plant supplies the following loads to the customers.

Times (hrs.) :	0 – 6	6 – 12	12 – 18	18 – 24
Load (MW)	50	100	80	120

Draw the load curve and load duration curve and calculate the load factor.

Calculate the plant capacity factor and utilization factor of the plant if its rated capacity is 150 MW.

(4 × 10 = 40 marks)

C 83701 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Mechanical Engineering

ME/PTME 09 703—METROLOGY AND INSTRUMENTATION

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Write short notes on readability ?
2. How do you classify the errors ?
3. List out the few applications on strain gauge ?
4. Define Laws of thermocouples.
5. What is sine bar ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Write about the calibration system in metrology.
7. Give details about the zero, first and second order instruments.
8. What is meant by primary and secondary transducers ? Brief the same.
9. Name the Industrial thermocouples and their ranges with application.
10. Define Ra, Rb , Rc and tp % with respect to surface roughness.
11. Enumerate the method of determining an absolute length of slip gauges.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. (a) Explicate the Generalized measuring system.

Or

(b) (i) Enumerate the desirable characteristics of precision measuring instruments.

(ii) Describe the different types of errors in measurement and their causes.

13. (a) With a sketch explain the different types of thermistors and its applications.

Or

(b) Draw the block diagram of the functional elements of pressure gauge and explain.

14. (a) Brief about (i) Liquid in glass thermometer ; (ii) Complete partial and total immersion thermometers ; and (iii) Resistance thermometers.

Or

(b) With a neat sketch enumerate about the types of flow meters based on the usage in Industry.

15. (a) Review the angular testing method by using Auto Collimator with application.

Or

(b) Enlighten any *two* types of direct method surface finish measurements.

(4 × 10 = 40 marks)

C 83700 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Mechanical Engineering

ME/PTME 09 702/AM 09 702—OPERATIONS MANAGEMENT

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

Each question carries 2 *marks.*

1. What do you mean by product life cycle ?
2. State the importance of master production scheduling in operations management.
3. What is BIN card ?
4. State the management significance of finding the finding the critical path through a network.
5. What is operations strategy ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

Each question carries 5 *marks.*

6. Contrast and compare CPM and PERT as a project management techniques.
7. Why are facilities decisions often made by top management ? Describe the duties of top management.
8. Describe the objectives of material management.
9. Discuss about dispatching and its significance in operation scheduling.
10. Narrate the five principles of good product design.
11. Distinguish between preventive and breakdown maintenance with a suitable example.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*

Each question carries 10 *marks.*

12. Explain in detail about productivity measurement and factors affecting productivity.

Or

13. Explain about any four qualitative methods of forecasting.

Turn over

14. Write short note on :

    (i) Flexible Manufacturing System. (5 marks)

    (ii) Layout design process. (5 marks)

Or

15. Explain in detail about the changes required if the firm moving from a batch process to an assembly line process in terms of finance, marketing, human resources, accounting and information systems.

16. Write short note on :

    (i) Role of Purchase Management in Materials Management. (5 marks)

    (ii) Role of Stores Management in Materials Management. (5 marks)

Or

17. In a hardware warehouse the independent demand for a commonly used steel spiral nails is 1000 units per month. The ordering cost is Rs. 200 per order placed. The carrying cost is 25% per unit per year and each unit cost Rs 2 :

    (a) What lot size should this product have ?

    (b) How often should this product be purchased ?

    (c) A quality team found a way to reduce ordering cost to Rs 30. How will that change the lot size and the frequency of purchasing for this product ?

18. Explain in detail about steps in project crashing with a suitable example.

Or

19. Write short note on :

    (i) Shortest route problem. (5 marks)

    (ii) Economic aspects in replacement of equipment. (5 marks)

[4 × 10 = 40 marks]

C 83699 (Pages : 3) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Mechanical Engineering

ME/PTME/AM 09 701—MACHINE DESIGN—II

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*

Each question carries 2 *marks.*

1. State the functions of friction clutches.
2. Define creep in transmission systems.
3. List the advantages of helical gear over spur gear.
4. What is surface durability of gears?
5. What type of allowances is generally incorporated into a casting pattern ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

Each question carries 5 *marks.*

6. Discuss the merits and demerits of belt, rope and chain drives for transmission of power.
7. What are the desirable properties of good journal bearing used in sliding contact bearing ?
8. Write the Soderberg's equation and state its applications to different types of loadings.
9. Explain the Buckingham's equation for dynamic load.
10. Explain the lubrication of gears.
11. Describe press forging. How does it differ from drop forging ?

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*

Each question carries 10 *marks.*

12. (a) A cone clutch is to transmit 7.5 kW at 900 r.p.m. The cone has a face angle of 12°. The width of the face is half of the mean radius and the normal pressure between the contact faces is not to exceed 0.09 N/mm^2. Assuming uniform wear and the co-efficient of friction between contact faces as 0.2. Determine the main dimensions of the cone clutch.

Or

(b) A vehicle equipped with a 13 bhp engine uses a chain drive to the rear axle. The driving sprocket runs at 900 r.p.m and the driven sprocket at 400 r.p.m with a centre distance of approximately 600 mm. With the front sprocket having 27 teeth, determine the following dimensions of the sprocket : (i) Outer Diameter ; (ii) Roller seating radius ; (iii) Root diameter ; (iv) Tooth flank radius ; (v) Tooth side radius ; (vi) Tooth width ; and (vii) Tooth side relief

13. (a) A bearing supports a power transmitting shaft of diameter 40 mm. The radial load coming on the bearing is 3000 N and the axial thrust 4500 N. If the shaft is subjected to light impact and rotates at 400 r.p.m. select a suitable anti friction bearing. Assume that the expected life of the bearing is 10,000 hours.

Or

(b) A Hollow shaft of 500 mm. outside diameter and 300 mm. inside diameter is used to drive a propeller of a marine vessel. The shaft is mounted on bearings 6 m. apart and it transmits 5600 kW at 150 r.p.m. Maximum axial thrust is 500 kN and the shaft weighs 70 kN. Determine : (a) Maximum shear stress induced ; and (b) Angular twist of the shaft between the bearings.

14. (a) Design a pair of spur gears to transmit 20 kW at a pinion speed of 1400 r.p.m. The transmission ratio is 4. The material for pinion and gear are 15 Ni2 Cri Mo 15 and C 45 respectively. The pressure angle of gear and pinion is 200.

Or

(b) A pair of spur gear with a 200 Pressure angle consists of a 25 teeth pinion meshing with 60 teeth gear. The module is 5 mm, while he face width is 45 mm. the pinion rotates at 500 r.p.m. The gears are made of steel and heat treated to a surface hardness of 220 BHN. Assume that dynamic load is accounted by means of the velocity factor. The service factor and the factor of safety in the spur gears are 1.75 and 2 respectively Calculate :

(i) Wear strength of gear.

(ii) Static load that the gear can transmit without pitting's.

(iii) Rated power that can be transmitted by gears.

15. (a) Explain the rules to be followed during the design if castings.

Or

(b) The Piston rod of a hydraulic cylinder exerts an operating force of 12 kN. The friction due to Piston packing and stuffing box is equivalent to 12 % of operating force. The pressure in the cylinder is 10 MPa. The cylinder is made of cast iron [Sut = 300 N/mm^2, FOS = 5 and $\mu = 0.27$). Determine the diameter and thickness of cylinder.

(4 × 10 = 40 marks)

C 83696 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 09 706 L22—SOFT COMPUTING TECHNIQUES

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*

Each question carries 2 *marks.*

I. 1 What is the use of SCHEMATA ?

2 What do you mean by supervised learning ?

3 Differentiate ADALINE and MEDALINE.

4 What are the applications of K-means clustering ?

5 Define membership function in Fuzzy logic.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

Each question carries 5 *marks.*

II. 1 Implement XOR function using McCulloth-Pitts neuron.

2 Mention the limitation of ART 1 network and how it is overcome in ART 2 network

3 What are the steps involved in designing the Fuzzy logic controllers ?

4 Explain the GA cycle of reproduction.

5 Using a learning rate of 0.25, find the new weights for the winning unit.

6 Enumerate the advantages of Genetic algorithms.

(4 × 5 = 20 marks)

Part C

Answer **all** *the questions.*
Each question carries 10 *marks.*

III. 1 Explain ADALINE and MADALINE Network ?

Or

2 Explain Linear Separability using an example ? Or Is XOR Gate Linear Separable ?

3 Explain Adaptive Resonance Theory (ART), and also explain ART1 and ART2 ?

Or

4 Explain Radial Basis Function Network (RBFN) in brief ?

5 Discuss Sugeno Model for FIS.

Or

6 Explain the construction and working of FIS systems.

7 Write short notes on Roulette wheel Selection, Random selection, Tournament Selection, Boltzman Selection ?

Or

8 Explain different types of Mutation operator in GA.

(4 × 10 = 40 marks)

C 83695 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 09 706 L20—MANAGEMENT INFORMATION SYSTEMS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. What are the components of MIS system.
2. List the classification of MIS.
3. Define Decision support system.
4. What is an RDMS ? list its importance
5. List the need for evaluation and maintenance of MIS.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. Discuss detail design phase of MIS development.
7. Distinguish off-line and on-line data processing.
8. "Without computer, it will very difficult to implement MIS." —Criticize the statement.
9. Explain the concept of data base management citing an example.
10. What is decision making ? Explain different types of decision making with Example.
11. Explain the implementation of expert system.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

12. Explain the role and duties of system analysts in management information manufacturing organizations.

Or

13. Explain the need of various information at the various levels of management in any organization.

14. Illustrate the managerial database in the role of MIS in information technology.

Or

15. List out various Database models. Explain any two widely used data base with example.

16. Explain with a neat flowchart about modal management id DSS.

Or

17. Illustrate with a neat working flow of multicriteria modeling in MIS.

18. Explain the assignment brief and mutual investigation in MIS by system expert.

Or

19. Describe in detail about Data collection and preparation in MIS.

(4 × 10 = 40 marks)

C 83694 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE/PTEE 09 706 L13—HIGH VOLTAGE ENGINEERING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Define gas law.
2. List out various quantities of transformer oil.
3. What is the principle of operation of a resonant transformer ?
4. How stray effect is reduced in shunt type of measurement ?
5. What are partial discharges ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

1. Explain the phenomena of electrical conduction in liquids.
2. Describe the current growth phenomenon in a gas subjected to uniform electric fields.
3. Explain simple voltage doubler used for generation of high D.C. voltages.
4. How are rectangular current pulses generated for testing purposes ? How is their time duration controlled ?
5. Explain the Hall generator for measuring high d.c. current
6. Discuss the factors affecting discharge detection.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

1. Explain clearly various processes which explain electric breakdown in vacuum.

Or

2. Describe the Paschen's law and its significance.

Turn over

3. Discuss elaborately the principle and operation of Cascaded transformers for generating high AC voltages.

Or

4. Give different circuits that produce impulse waves explaining clearly their relative merits and demerits.

5. Explain the method of measuring high voltage D.C. using series resistance micro ammeter and hence its limitations.

Or

6. Describe chubb and Forfesque method of measuring high A.C. peak voltages.

7. Describe the Schering bridge method of determining the capacitance and loss angle of a dielectric specimen. Derive the relevant formula.

Or

8. Develop wave equation of travelling waves in transmission line and also discuss the Behavior of travelling waves in open circuited transmission lines.

(4 × 10 = 40 marks)

C 83693 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 09 705 L23—PROCESS CONTROL AND INSTRUMENTATION

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*

Each question carries 2 *marks.*

I. 1 Give the transfer function of a process with inverse response characteristics.

2 Draw the inherent valve characteristics of an equal percentage valve.

3 What is the drawback in a P-controller ? How do you overcome it ?

4 List any *two* evaluation criteria to evaluate the performance of a controller.

5 State optimum control.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

Each question carries 5 *marks.*

II. 1 Discuss the principles of process control.

2 Briefly explain the working principle of I/P converter.

3 Elaborate the significance of control valve sizing.

4 Explain briefly the signal conditioning transducers.

5 List the advantages and disadvantages of a feed forward control scheme.

6 Draw the block diagram of a split range control scheme and briefly explain its operation.

(4 × 5 = 20 marks)

Part C

Answer **all** *the questions.*
Each question carries 10 *marks.*

III. 1 Differentiate continuous and batch process with the help of suitable examples.

Or

2 Explain the system evaluation stability measures taken in process control.

3 Explain the working principle of a pneumatic actuator with positioner with help of a neat sketch.

Or

4 Discuss in detail about the Flow transducers with neat sketch.

5 The level in a continuous - flow mixing tank is controlled by a proportional controller. The normal level is 8 m. the overall gain of a feedback loop is 9.0 and the load variable gain for changes in feed rate is 0.4 m/m^3/min. If the set point is moved from 8 m. to 8.5 m.) what will be the new level ?

Or

6 Explain the action of a PI control scheme with an example. Also list the merits and demerits.

7 Explain in detail the working of a cascade control scheme with the help of a neat diagram. Also list the steps involved in the Turing of cascade control scheme.

Or

8 Explain the operation of adaptive control scheme with the help of a neat block diagram.

(4 × 10 = 40 marks)

C 83692 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE/PTEE 09 705 L10—SWITCHED MODE POWER CONVERTERS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 marks.

1. Explain the principle of volt second balance in inductors.
2. Sketch the waveform of a full bridge d.c.-a.c. converter with bipolar voltage switching.
3. Discuss why transformer isolations are needed in high frequency power conversion.
4. What do you understand by Zero Voltage Switching ?
5. Compare ZVS and ZCS topologies.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 marks.

6. Obtain the input-output voltage and current relation as a function of duty ratio for a Buck-Boost d.c.-d.c. converter in continuous conduction mode.
7. Explain the operation of resonant ZVS Boost converter and deduce the expression for d.c. gain.
8. For a Cuk d.c.-d.c. converter operating under CCM, draw the circuit diagram and current and voltage waveforms of inductors. Also derive an expression for output voltage in terms of input voltage and duty cycle.
9. In a full bridge converter circuit $V_d = 300$ V, $m_a = 0.8, m_f = 39$ and fundamental frequency is 47 Hz. Calculate r.m.s. values of the fundamental frequency voltage and some dominant harmonics in the output voltage v_0 if a PWM bipolar voltage switching is used.
10. Explain the operation of fly back converter with neat circuit and waveforms.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

11. Explain the operation of Boost converter with neat circuit and waveforms in Continuous conduction mode.

Or

12. Design a Buck converter to produce an output voltage of 18 V across 10 Ω load resistance. The output voltage ripple must not exceed 0.5 percent. The D.C. supply is 48 V. Design for continuous inductor current. Find out the duty ratio, the values of inductance and capacitor.

13. With the help of neat diagram explain the three-phase inverter operation, also discuss the effect of blanking time on voltage in PWM inverter.

Or

14. Explain square wave switching scheme in inverter and how to achieve the programmed harmonic elimination technique used in square wave pulse switching.

15. Discuss the operation of ZCS resonant switch converters. Draw the circuit diagram and relevant waveforms.

Or

16. Discuss the operation of parallel resonant dc -dc converter with the help of circuit diagram.

17. Describe the operation of a push-pull dc-dc converter with waveforms. Deriving an expression for input-output voltage relation, show that push-pull dc-dc converter is a buck derived topology.

Or

18. Explain power line disturbances caused by switching power converts.

(4 × 10 = 40 marks)

C 83691 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME] EXAMINATION, APRIL 2020

Electrical and Electronics Engineering

EE 09 705 L08—VLSI DESIGN

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*
Each question carries 2 *marks.*

I. 1 List the steps involved in IC fabrication.

2 What is meant by Interconnect ? Mention their types.

3 Define threshold voltage.

4 Write the rules for combining timing types.

5 Draw the circuit diagram for CMOS two-input NOR gate.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

II. 1 Compare and Contrast between CMOS and Bipolar technology.

2 Write short notes on Twin tub process.

3 Explain the various symbols used in stick diagram notation ?

4 Write short notes on area capacitances of layers.

5 Explain briefly about sheet resistance ?

6 Write notes on sequencing dynamic circuits.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **all** *the questions.*
Each question carries 10 *marks.*

III. 1 With neat sketches explain the CMOS n-well fabrication process indicating the masks used.

Or

2 Explain N-well process with neat diagrams.

3 With neat diagrams, explain the operation of NMOS enhancement mode transistor ?

Or

4 What is a stick diagram ? Draw the stick diagram and layout for a CMOS inverter.

5 What are the different types of design rules ? Explain.

Or

6 Describe three sources of wiring capacitances. Explain the effect of wiring capacitance on the performance of a VLSI circuit.

7 Explain switch logic and its arrangements ? And also explain properties of transmission gate.

Or

8 Discuss the clocked sequential circuits for subsystem design.

(4 × 10 = 40 marks)