

**THIRD SEMESTER (CBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2021**

Electronics

ELE 3C 05—DIGITAL ELECTRONICS

(2019—2020 Admissions)

Time : Two Hours

Maximum : 60 Marks

Section A

*Answer at least **eight** questions.*

Each question carries 3 marks.

All questions can be attended.

Overall Ceiling 24.

1. What are alphanumeric codes ? For what they are used ?
2. What is 1' complement representation method ?
3. State and prove associative law of Boolean algebra.
4. What is a Maxterm ?
5. Can a multiplexer be used to realize logic functions ? If yes, in what ways this realization is better than realization using logic gates ?
6. What is an Encoder ?
7. What do you mean by toggling ?
8. What are the types of loading in a shift register ?
9. What are the asynchronous inputs of a flip-flop ?
10. List any four applications of counters.
11. What are RAMs ? How they differ from ROMs ?
12. Is ROM a volatile memory ? Explain.

(8 × 3 = 24 marks)

Turn over

Section B

Answer at least five questions.

Each question carries 5 marks.

All questions can be attended.

Overall Ceiling 25.

13. Given $\overline{A}\overline{B} + \overline{A}B = C$, show that $\overline{A}\overline{C} + \overline{A}C = B$.
14. Discuss hexadecimal number system.
15. Realize the logic expression using MUX. $F1 = \sum m(1, 3, 4, 7, 12, 14, 15)$.
16. Realize a full adder using NAND gates only.
17. With neat diagrams, explain the working of 4-bit ring counter.
18. With neat diagrams, explain the operation of T and D flip-flops.
19. What are the different types of ROMs ? Explain.

(5 × 5 = 25 marks)

Section C

Answer any one question.

The question carries 11 marks.

20. What are the different types of gates ? Explain in detail each of them.
21. Design a 3 bit synchronous up counter.

(1 × 11 = 11 marks)

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Electronics

ELE 3B 05—DIGITAL ELECTRONICS

(2019—2020 Admissions)

Time : Two Hours

Maximum : 60 Marks

Section A

Answer atleast eight questions.

Each question carries 3 marks.

All questions can be attended.

Overall ceiling 24.

1. What are universal gates ? Why are they called so ?
2. Convert the following numbers to hexadecimal :
(a) $(1011011011)_2$; (b) $(1101101101101.1011)_2$; (c) $(176245)_8$ d) $(409657)_{10}$.
3. State commutative law and associative law of Boolean algebra.
4. Which is the most popular and most widely used digital IC family ? What are its merits ?
5. Why is multiplexer called a data selector ?
6. What are full-adders ? How can it be realized with two half-adders?
7. What is code-convertors ?
8. Which flip-flop is preferred for counting ? Which one is preferred for data transfer ?
9. What are shift registers ?
10. How many decade counters are required to convert a clock of 100MHz to 100Hz ?
11. Which is the fastest ADC and why ?
12. Define the following parameters of DACs :
(a) Resolution ; (b) Accuracy ; (c) Settling time ; and (d) Monotonicity.

(8 × 3 = 24 marks)

Turn over

Section B

*Answer atleast **five** questions.*

Each question carries 5 marks.

All questions can be attended.

Overall ceiling 25.

13. Obtain the minimal SOP expression for $\Sigma m(5, 6, 7, 9, 10, 11, 13, 14, 15)$ and implement it in NAND logic.
14. With the help of a diagram, explain an octal-to-binary encoder.
15. Realize a single bit comparator.
16. Explain the basic types of shift registers.
17. With the help of a diagram, explain the operation of JK Master-Slave flip-flop.
18. Explain the working of counter type ADC.
19. What are MOD counters ? Explain the state diagram of MOD 6 counter.

(5 × 5 = 25 marks)

Section C

*Answer any **one** question.*

Each question carries 11 marks.

20. Realize a 4 bit synchronous up counter with necessary state diagram and design.
21. Explain with necessary diagrams Ring Counter and Johnson Counter.

(1 × 11 = 11 marks)

**THIRD SEMESTER (CUCBCSS-UG) DEGREE EXAMINATION
NOVEMBER 2021**

Electronics

ELE 3C 03—DIGITAL ELECTRONICS

(2014—2018 Admissions)

Time : Three Hours

Maximum : 64 Marks

Section A

*Answer all questions.
Each question carries 1 mark.*

1. The binary equivalent of the decimal number 19_{10} .
2. A Karnaugh map is a systematic way of reducing which type of expression ?
3. What is the binary equivalent of the octal number 75_8 ?
4. Convert the binary number 1010011010_2 to Hexadecimal number.
5. What is Encoding ?
6. Why is a multiplexer called a data selector ?
7. What is a flip-flop ?
8. How does a register output data ?
9. Define modulus of a counter.
10. What is a computer program called when it is permanently stored in a ROM ?

(10 × 1 = 10 marks)

Section B

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

11. Write a short note on Octal number system.
12. Find 2's complement of binary number 10110010_2 .
13. What is a Half subtractor ? Write down the truth table of a Half subtractor.
14. What is a decoder ? Name any two decoders.

Turn over

15. What is race around condition ?
16. Draw the symbol and Truth table of following logic gates :
(a) AND gate ; and (b) XOR gate.
17. Distinguish volatile memory and non-volatile memory.

(7 × 2 = 14 marks)

Section C

*Answer any **five** questions.
Each question carries 4 marks.*

18. Compare Asynchronous and Synchronous counters.
19. (a) Add the binary numbers 1101.101_2 and 111.011_2 .
(b) Multiply the binary number 1101_2 by 110_2 .
20. Write a short note on Binary Coded Decimal (BCD).
21. With neat diagram explain the working of a master-slave JK flip-flop.
22. Convert the Boolean expression $(A + \bar{B})(B + C)$ to a standard POS form.
23. Compare SRAM and DRAM.
24. Explain the working of a Half adder and full adder circuit.
25. Discuss the concept of a multiplexer with 4 input lines.

(5 × 4 = 20 marks)

Section D

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

26. (a) What are the different types of Read Only Memory. Explain.
(b) Distinguish between dynamic and static memory.
27. Design a 4 bit synchronous up counter

28. (a) State and Prove De Morgan's theorems. Draw the gate equivalent.
- (b) Reduce the expression $f = \sum_m(1, 2, 4, 6, 7)$ using K map and implement it using gates.
29. (a) Realize AND, OR, NOT and NOR gates by using NAND gate.
- (b) Why a demultiplexer called a distributor. Discuss the concept of 1 line to 4 line Demultiplexer.

(2 × 10 = 20 marks)

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**THIRD SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2021**

Electronics

ELE 3B 04—ANALOG AND DIGITAL INTEGRATED CIRCUITS

(2014—2018 Admissions)

Time : Three Hours

Maximum : 80 Marks

Part A

*Answer all questions
Each question carries 1 mark.*

1. What is input bias current ?
2. What is drop out voltage in a linear voltage regulator ?
3. Write the equation for frequency of oscillation of RC phase shift oscillator ?
4. Define hysteresis voltage of a Schmitt trigger.
5. Draw the frequency response curve of a low high pass filter ?
6. Write down the two fundamental commutative laws related with Boolean algebra ?
7. Why is a De-multiplexer called a data distributor ?
8. Convert the decimal number 35 to BCD.
9. Define a flip flop ?
10. The decimal equivalent of the binary number 1001011.

(10 × 1 = 10 marks)

Part B

*Answer any **five** questions
Each question carries 2 marks.*

11. What is the need of a level shifter in an operational amplifier ?
12. Define SVRR ?
13. Draw the circuit diagram of a non-inverting amplifier for a gain of 11.
14. Draw the voltage transfer curve of an op-amp.

Turn over

15. Convert the Boolean expression $A\bar{B}C + \bar{A}\bar{B} + ABD$ into the standard SOP form.
16. Describe PIPO shift register.
17. Write short note on Hexadecimal number system.

(5 × 2 = 10 marks)

Part C

*Answer any **six** questions
Each question carries 5 mark.*

18. Explain about a two input non-inverting adder circuit using IC 741.
19. Draw a dual input balanced output differential amplifier and explain.
20. Draw the block diagram of IC 555 and explain.
21. Design a band pass filter for cutoff frequencies 1 kHz and 5 KHz using IC 741.
22. What is Encoding. Explain Decimal to BCD encoder.
23. (a) What are the merits and demerits of ECL ?
(b) Compare asynchronous and synchronous counters ?
24. Explain the concept of 4 bit Johnson counter. Why Johnson counter is known as twisted ring counter.
25. Draw and explain the working of a mod 10 asynchronous counter.

(6 × 5 = 30 marks)

Part D

*Answer any **two** question
Each question carries 15 mark.*

26. (a) Derive an expression for the gain of an inverting amplifier. (8 marks)
- (b) Solve the equation using operational amplifier $Y = V_1 + V_2 - V_3$. (7 marks)

27. (a) Draw a mono stable multivibrator using 555 and explain with necessary waveforms. (10 marks)
- (b) Design a mono stable multivibrator using 555 for a time constant of 2 ms. (5 marks)
28. (a) What are the universal gates ? Prove their validity. (8 marks)
- (b) Draw and Explain the concept of 4×1 multiplexer. (7 marks)
29. (a) With neat diagram. Explain the working of a JK flip flop What are the limitations ? How can you eliminate the limitations? (10 marks)
- (b) What are the applications of counters ? (5 marks)
- [2 × 15 = 30 marks]