D 91123

SECOND SEMESTER M.C.A. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, DECEMBER 2020

M.C.A.

MCA 18 205—JAVA PROGRAMMING

(2018 Admissions)

Time : Three Hours   Maximum : 100 Marks

Answer any **five** *full questions.*
Each question carries 20 *marks.*

1. What do you mean by applets ? Explain its types. How do applets differ from application program ? Explain with help of example.

2. What do you mean by socket programming ? Explain various methods associated with TCP and UDP.

3. What are Packages ? Explain the procedure for creating and using packages with an example.

4. Explain Exception handling mechanism in java with suitable examples.

5. What is the difference between a class and interface ? Write a program in java to illustrate the implementation of multiple inheritance through interfaces.

6. What is object-oriented programming ? Discuss the object-oriented features of Java with examples. Also discuss the differences between Java and C++.

7. Explain with examples, the various graphics methods supported by AWT. How color of an object can be changed ?

                                                                      (5 × 20 = 100 marks)

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SECOND SEMESTER M.C.A. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, DECEMBER 2020

M.C.A.

MCA 18 204—COMPUTER NETWORKS

(2018 Admissions)

Time : Three Hours   Maximum : 100 Marks

Answer **five** *full questions.*
Each question carries 20 *marks.*
Question Number 1 *to* 7.

1. Define different categories of network and Explain in detail Wi-Max with neat diagram.

2. Explain :

   - Hub.

   - Switch.

   - Bridges.

   - Routers.

   - Gateway.

3. (a) Describe switching techniques in details ?

   (b) Explain any *five* network ports.

4. Explain IP addressing and Subnetting.

5. What are the upper layers of the OSI model ? Explain them.

6. (a) Explain different network topologies in detail.

   (b) Explain ATM architecture.

7. Explain Distance vector routing algorithm with advantages and disadvantages in detail.

SECOND SEMESTER M.C.A. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, DECEMBER 2020

M.C.A.

MCA 18 203—DATA STRUCTURES

(2018 Admissions)

Time : Three Hours   Maximum : 100 Marks

Answer **five** *full questions.*

Each question carries 20 *marks.*

1. (a) What are the different types of asymptotic notations ? Explain with examples.   (10 marks)

   (b) What is a sparse matrix ? Explain the steps to perform multiplication of two sparse matrixes with an example.

                   (10 marks)

2. (a) Explain in detail the steps for evaluation of a postfix expression. Evaluate the postfix expression given below :

   53+62/*35*+

                   (10 marks)

   (b) What is a doubly linked list ? Write algorithm for performing insertion and deletion in doubly linked list.

                   (10 marks)

3. (a) What is a threaded binary tree ? Explain with an example how inorder traversal can be done using threaded binary tree. What are the advantages of using threaded binary tree for inorder traversal ?

                   (15 marks)

   (b) What is a binary search tree ? List the properties of a binary search tree.   (5 marks)

Turn over

4. (a) Describe the steps to perform Depth First Search traversal. Find the Depth First Search traversal of the graph given below :
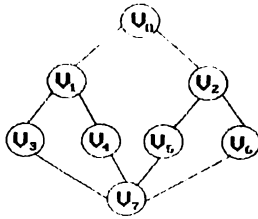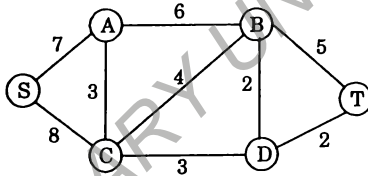

(10 marks)

  (b) With suitable example explain the steps in Dijisktra's algorithm.

(10 marks)

5. (a) What is hashing ? What is the need for a good hash function ? Explain with an example the concept of separate hashing.

(10 marks)

  (b) What is a minimum spanning tree? Using Krushkal's algorithm find the minimum spanning tree of the below given graph. (Show each step).

(10 marks)

6. (a) With an example explain the steps in bubble sorting.   (10 marks)

  (b) Write notes on external sorting.   (10 marks)

7. (a) Explain the steps in selection sorting. Sort the list given below (show each step).

      A = {39, 9, 81, 45, 90, 27, 72, 18} .

(10 marks)

  (b) List the various sorting techniques and compare the average case, best case and worst case complexity of the sorting algorithms.

(10 marks)

[5 × 20 = 100 marks]

D 91120

SECOND SEMESTER M.C.A. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, DECEMBER 2020

M.C.A.

MCA 18 202—COMPUTER ORGANIZATION AND ARCHITECTURE

(2018 Admissions)

Time : Three Hours   Maximum : 100 Marks

Answer full **five** *questions.*

Each question carries 20 marks.

1. I Explain the components of a computer with the block diagram in detail.

   II Explain the techniques used to measure the performance of a computer.

2. I Explain with a diagram the designs of a fast multiplier using carry save Adder circuit.

   II Explain the various Instruction types ?

3. I Explain the design of ALU in detail.

   II State and explain the different types of hazards that can occur in a pipeline.

4. I Define Virtual Memory. Explain the process of converting virtual addresses to physical addresses with a neat diagram.

   II What is Memory Interleaving ? Explain the addressing of multiple modules Memory system.

5. I Explain with the block diagram the DMA transfer in a computer system.

   II Discuss the design of a typical input or output interface.

6. I Draw and explain the various types of secondary storage devices.

   II Explain the features of PCI and SCSI bus.

7. I Describe the operational concepts between the processor and memory.

   II Explain with a neat block diagram, the hardware components needed for connecting a keyboard to a processor.

$(5 \times 20 = 100 \text{ marks})$

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Reg. No................................

SECOND SEMESTER M.C.A. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, DECEMBER 2020

M.C.A.

MCA 18 201—OPERATING SYSTEM

(2018 Admissions)

Time : Three Hours　　　　　　　　　　　　　　　　　　　　　Maximum : 100 Marks

*Answer full **five** questions.*

Each question carries 20 marks.

1. List and briefly explain the characteristics of a good process scheduler.

2. Consider the following set of processes with the arrival times and the CPU burst times given in milliseconds What is the average turnaround time with Round Robin Scheduling algorithm if time quantum is 3 milli seconds. Also draw the chart of scheduling.

Process	Arrival Time	Execution Time
P0	0	5
P1	1	3
P2	2	8
P3	3	6

3. Explain the necessary and sufficient conditions that lead to a dead lock.

4. Differentiate Paging and Segmentation.

5. List and explain different methods for allocation in a File System ?

6. What is protection ? Explain different protection mechanisms in a general purpose operating system.

7. What is a PCB? List and briefly explain the information contained in PCB associated with a process.

(5 × 20 = 100 marks)

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SECOND SEMESTER M.C.A. DEGREE (SUPPLEMENTARY) EXAMINATION, DECEMBER 2020

M.C.A.

MCA 10 205—DATA STRUCTURES

(2010 Admissions)

Time : Three Hours

Maximum : 100 Marks

Answer any **five** *questions.*

All questions carry equal marks.

1. (A) Define and explain stack data structure with suitable example. Give algorithms for push, pop, stack full and stack empty function ?

    (B) Write notes on :

        (a) Big oh notation ; (b) Recursion.

    (10 + 10 = 20 marks)

2. (A) What is Queue ? Explain working of a circular queue and give algorithms to insert and delete an element from circular queue.

    (B) What is the difference between stack and queue ?

    (10 + 10 = 20 marks)

3. (A) Explain any *two* non-linear data structure with suitable example.

    (B) Which is the best method of implementing sets ? Justify your answer with suitable example ?

    (10 + 10 = 20 marks)

4. (A) Explain open and closed hashing ? How to resolve collision with hashing ?

    (B) Implement a binary search tree and conduct a Pre-order, In order and Post order traversals.

    (10 + 10 = 20 marks)

5. (A) Explain with an algorithm to implement Insertion Sort.

    (B) What are heap data structures ? Write an algorithm for construction of heap. Explain max heap and min heap with suitable example. (10 + 10 = 20 marks)

6. (A) For a singly linked list, write algorithms to

   (a) Count no. of nodes in the list ; (b) Append 2 lists together.

   (B) Differentiate between Depth first search and Breadth first search.

   (10 + 10 = 20 marks)

7. (A) What are different ways by which we can represent sets ?

   (B) Explain recursion by explaining Tower oh Hanoi problem.

   (10 + 10 = 20 marks)

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SECOND SEMESTER M.C.A. DEGREE (SUPPLEMENTARY) EXAMINATION DECEMBER 2020

M.C.A.

MCA 10 204—OPERATING SYSTEMS

(2010 Admissions)

Time : Three Hours　　　　　　　　　　　　　　　　　　　　　Maximum : 100 Marks

Answer any **five** *questions.*

All questions carry equal marks.

I. (a) Explain the various factors in operating system design. How these factors influenced in the design of OS ?

　(b) With the help of necessary diagrams explain threads. How shared facility is managed by threads ?

II. (a) Define a process. With the help of a neat diagram explain different states of a process and a PCB.

　(b) What are process address space ? Explain how an address space is created ?

III. (a) What are pre-emptive scheduling strategies ? Explain with two examples.

　(b) What are semaphores ? How semaphored can be used and implemented ?

IV. (a) What are deadlocks ? What are the necessary conditions for arising deadlock situation ?

　(b) Explain Bankers algorithm.

V. (a) Explain fixed partition and variable partition memory strategies. Give examples of both.

　(b) Explain various memory management strategies in modern Operating System.

VI. (a) Explain paging. Give the structure of a page table.

　(b) Define segmentation. What are its advantages and disadvantages ? Why segmentation and paging are combined into one scheme.

VII. (a) What are byte stream file system ? Explain the typical operations on a byte stream file.

　(b) Which are the necessary parts of the file manager to handle record oriented file system. Explain the 'open' and 'close' operations on file.

（5 × 20 = 100 marks)

SECOND SEMESTER M.C.A. DEGREE (SUPPLEMENTARY) EXAMINATION DECEMBER 2020

M.C.A.

MCA 10 203—DATABASE MANAGEMENT SYSTEMS

(2010 Admissions)

Time : Three Hours   Maximum : 100 Marks

Answer any **five** *full questions*
All questions carry equal marks.

1. **(A)** Write short note on :

   (a) Data model and its types.

   (b) ER-Diagram for Banking System.

   (B) Compare & Contrast the following terms with proper explanation :

   (a) Data dependence versus data-independence.

   (b) Structured data versus unstructured data.

   (c) Repository versus database.

   (d) Enterprise data model versus conceptual data model.

                                             (10 + 10 = 20 marks)

2. **(A)** Explain in detail about : (i) B+ Tree index and (ii) B Tree Index Files.

   (B) Explain the B+ indexes on multiple keys with suitable example.

                                             (10 + 10 = 20 marks)

3. **(A)** What are Normal Forms ? Explain the types of Normal forms with Example.

   (B) State and explain the DDL, DML and DCL commands. Justify the need of embedded SQL.

                                             (10 + 10 = 20 marks)

4. **(A)** What is concurrency control? Explain concurrency control in terms of Two phase locking protocol

   (B) Write Short Notes on :

   1) Transaction Processing in DBMS.

   2) Dead Locks.

                                             (10 + 10 = 20 marks)

Turn over

5. (A) Explain in detail RAID Technology.

   (B) With suitable diagrams discuss the RAID Levels (Level 0, Level 1, Level 2 , Level 3, Level 4 and Level 5)

                                                                    (10 + 10 = 20 marks)

6. (A) Define BCNF. What is Multivalued dependency ? When does it arise ?

   (B) Define join dependency. Why 5NF alsocalled PJNF ?

                                                                    (10 + 10 = 20 marks)

7. (A) Explain the different types of security in database. What are the threats to databases ? Explain the control measures used to provide security of data.

   (B) Write notes on : a) Statistical data base security ; b) Three phases of ARIES recovery method.

                                                                    (10 + 10 = 20 marks)

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SECOND SEMESTER M.C.A. DEGREE (SUPPLEMENTARY) EXAMINATION DECEMBER 2020

M.C.A.

MCA 10 202—COMPUTER ORGANIZATION

(2010 Admissions)

Time : Three Hours   Maximum : 100 Marks

Answer any **five** *questions.*

All questions carry equal marks.

I.   (a) Explain various methods to measure the performance of a computer.

     (b) Explain various addressing modes.

II. (a) What are the different methods of representing numbers in a Computer ?

     (b) Explain stored program concept.

III. (a) Explain the procedures to design an ALU.

     (b) Compare Single cycle, non-pipelined execution and pipelined execution.

IV. (a) Explain how the 'Principle of locality' is implemented in the design of memory.

     (b) How the miss penalty can be reduced using multilevel caches.

V.   (a) Discuss the types of I/O devices and their characteristics.

     (b) Discuss the methods of transferring data between I/O device and memory.

VI. (a) Write short notes on :

          (i)   SPEC CPU benchmark.

          (ii) SPEC power benchmark.

     (b) What are the components on which the performance of a program depends ? Elaborate how they affect CPU performance equation.

VII. (a) What is the purpose of exception enable ?

     (b) What are page faults ? How page faults are handled ?

                                                        (5 × 20 = 100 marks)

SECOND SEMESTER M.C.A. DEGREE (SUPPLEMENTARY) EXAMINATION DECEMBER 2020

M.C.A.

MCA 10 201—GRAPH THEORY AND COMBINATORICS

(2010 Admissions)
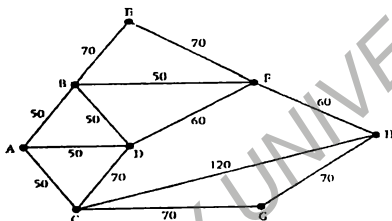
Time : Three Hours   Maximum : 100 Marks

Answer any **five** *questions.*

All questions carry equal marks.

1. Write an algorithm to find an optimal Chinese postman route and use the algorithm to find the optimal route for the following network :
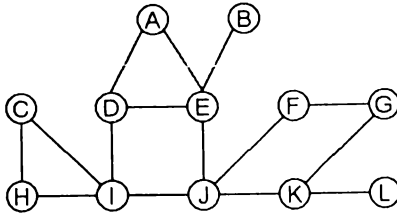

(20 marks)

2. State Kuratowski's theorem on planar graphs. Discuss any *one* application of Kuratowski's theorem.

(20 marks)

3. (a) Define a spanning tree. Discuss with example, any *one* algorithm to find the minimum cost spanning tree from an undirected graph.

   (b) Explain about biconnected components and the articulation point. Find the biconnected components and articulation points of the following graph with justification.

Turn over

(10 + 10 = 20 marks)

4. Explain the following with the help of examples :

    (a) Dijkstra's single source shortest path algorithm.

    (b) Bellman-Ford single source shortest path algorithm.

(10 + 10 = 20 marks)

5. Define the max flow problem for a general unweighted directed graph. Write an algorithm to solve maximum bipartite matching problem using a network flow approach. Explain the algorithm with the help of an example.

(20 marks)

6. (a) A question paper consists of *ten* questions divided into two parts A and B. Each part contains five questions. A candidate is required to attempt six questions in all of which at least 2 should be from part A and at least 2 from part B. In how many ways can the candidate select the questions if he can answer all questions equally well ?

    (b) Show that $24n + 4 - 15n - 16$ where $n \in N$ is divisible by 255.

(10 + 10 = 20 marks)

7. Solve the recurrence equation $a_n - 3a_{n-1} - 10a_{n-2} = 28 \times 5^n$ for $n \geq 2$, with $a_0 = 25$ and $a_1 = 120$.

(20 marks)