

(DMCA 101)

M.C.A. DEGREE EXAMINATION, DECEMBER 2019.

First Year

INFORMATION TECHNOLOGY

Time : Three hours

Maximum : 70 marks

SECTION A – (3 × 15 = 45 marks)

Answer any **THREE** questions.

1. What is structure of IT organization? Explain in detail about IT support at different organizations levels.
2. Discuss in detail about evaluation of computer hierarchy.
3. (a) Explain about various application software's and its use.
(b) Describe different types of programming languages and their features.
4. Discuss various issues in telecommunication systems.
5. What is internet? Explain about the operation of Internet and also give the services provided by internet.

SECTION B – (5 × 4 = 20 marks)

Answer any **FIVE** questions from the following.

6. Describe capabilities expected of information system in modem organizations?
7. Write about departmental information system, plant information system and divisional information system.
8. Write about various types input technologies.
9. Explain the working of Compact Disk (CD) and Digital Versatile Disk (DVD).
10. What is file system? Give the advantages and disadvantages of it.
11. Write short notes on Enterprise software.
12. What are the different network topologies?
13. Write short notes on World Wide Web.

SECTION C – (5 × 1 = 5 marks)

Answer ALL questions.

14. What is meant by Intelligent system?
 15. What is use of E — R diagrams?
 16. What is use of modem?
 17. Differentiate internet and intranet.
 18. What is RAM and ROM?
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M.C.A. DEGREE EXAMINATION, DECEMBER 2019.

First Year

PROGRAMMING WITH C++

Time : Three hours

Maximum : 70 marks

SECTION A – (3 × 15 = 45 marks)

Answer any **THREE** questions.

1. (a) Differentiate between C and C++.
(b) What is stream and stream classes? How streams are represented in C++?
2. What is meant by function overloading? Why it is known as function polymorphism in OOp?
3. Explain about multiple inheritance and hybrid inheritance with suitable program.
4. What is an exception? List the principles of exception handling. With a suitable program explain exception handling mechanism of C++.
5. What is syntax of class template? Write a C++ Program to add two integers, two floats and two complex numbers using class templates?

SECTION B – (5 × 4 = 20 marks)

Answer any **FIVE** questions from the following.

6. Describe the syntax of while and do – while loops in C++.
7. What is encapsulation? Demonstrate data hiding and encapsulation.
8. What is inline function? Give the syntax. What are the advantages of inline function?
9. What is meant by function prototyping? Explain the importance of call by value.
10. What is operator overloading? What operators cannot be overloaded?
11. Illustrate copy constructor with suitable example.
12. How to access data from private class? Give an example.
13. Describe the concept of Volatile member function.

SECTION C – (5 × 1 = 5 marks)

Answer ALL questions.

14. What is parameter constructor?
 15. Give the purpose of new and delete operators.
 16. Define late binding.
 17. What is nested class?
 18. What is virtual function?
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M.C.A. DEGREE EXAMINATION, DECEMBER 2019.

First Year

COMPUTER ORGANIZATION

Time : Three hours

Maximum : 70 marks

SECTION A – (3 × 15 = 45)

Answer any **THREE** questions from the following

1. Discuss evaluation of computers in detail.
2. Explain PCI configuration of desktop system and server system.
3. Draw magnetic disk data layout and also explain how the data written onto a magnetic disk?
4. Show the step by step multiplication process using Booth algorithm when the following binary numbers are multiplied $(+15) * (-13)$. Assume 5-bit registers that hold signed numbers and draw the flow chart for the corresponding example.
5. Discuss about different CPU organizations with examples

SECTION B – (5 × 4 = 20 marks)

Answer any **FIVE** questions from the following

6. What are the structural components of digital computer?
7. What is an embedded system? Give their applications in market.
8. Explain about PCI bus structure with neat sketch.
9. Write about CD — ROM block format.
10. Draw the flow chart for division algorithm.
11. Find the following difference using twos complement arithmetic: $111000 - 110011$
12. Explain how the mapping from an instruction code to a microinstruction address can be done by means of a read only memory.
13. Write about Two-Stage Instruction Pipeline.

SECTION C – (5 × 1 = 5 marks)

Answer **ALL** questions.

14. What is memory address register?
 15. Define interrupt.
 16. Define pipeline.
 17. What is meant by fixed point representation?
 18. What is optical disk?
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M.C.A. DEGREE EXAMINATION, DECEMBER 2019.

First Year

DATA STRUCTURES

Time : Three hours

Maximum : 70 marks

SECTION A – (3 × 15 = 45 marks)

Answer any THREE questions from the following.

1. What is an algorithm? Discuss different notations used to represent an algorithm.
2. Explain about different string pattern matching algorithms with suitable example.
3. (a) Write an algorithm to insert and delete a key from circular queue.
(b) Describe how a polynomial is represented using singly linked lists.
4. (a) Write a routine for inserting an element into the binary search tree.
(b) Define threaded binary tree. Explain in-order threading using suitable example.
5. What is hash function? Discuss about different hashing functions.

SECTION B – (5 × 4 = 20 marks)

Answer any FIVE questions from the following

6. What is string? List down any four string handling functions.
7. Write an algorithm to find an element from array using binary search.
8. What is sparse matrix? How to assign memory to sparse matrix?
9. Construct the AVL tree for the following
34, 67, 23, 15, 45, 37, 28, 9, 13.
10. What are the properties of binary search tree?
11. Write about different stack operations?

12. Explain the evaluation of prefix expression. Find the equivalent prefix of:
863+*123-/-

13. Explain the working principle of Radix Sort for the list given?
221, 121, 322, 14, 103, 435, 345, 116

SECTION C – (5 × 1 = 5 marks)

Answer ALL questions.

14. Define flowchart?

15. What is record?

16. Define priority queue.

17. What is Red — Black tree?

18. List down applications of stacks.

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OPERATING SYSTEM

Time : Three hours

Maximum : 70 marks

SECTION A — (3 × 15 = 45 marks)

Answer any THREE questions from the following.

1. Explain various managements of operating system and their responsibilities in detail.
2. Consider the following set of processes with length of CPU burst time and arrival time given in milliseconds.

Process	Burst Time	Arrival Time
P1	5	1.5
P2	1	0
P3	2	2
P4	4	3

Illustrate the execution of these processes using FCFS, SJF CPU scheduling algorithms. Also calculate wait time, turnaround time for each process. Also calculate Average waiting time, average turnaround time for above situation.

3. Explain in detail how semaphores and monitors are used to solve producer-consumer problem.
4. Explain the various page replacement strategies.
5. Discuss various security issues protected by Operating system.

SECTION B — (5 × 4 = 20 marks)

Answer any FIVE questions from the following.

6. Describe the various components of process control block.
7. What are the different types of scheduling's?
8. What is Directory? What are the operations that can be performed on a directory?
9. What is demand paging and what is its use?

10. Write short note on I/O device drivers.
11. Write about Shortest-Seek-Time-First (SSTF) disk scheduling.
12. What is critical section problem? State the requirements of critical section problem solution.
13. Write about different types of threat.

SECTION C — (5 × 1 = 5 marks)

Answer ALL questions.

14. Define thread.
 15. Define segmentation.
 16. What is page fault?
 17. List the various file attributes.
 18. Define overlays.
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M.C.A. DEGREE EXAMINATION, DECEMBER 2019.

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DATABASE MANAGEMENT SYSTEMS

Time : Three hours

Maximum : 70 marks

SECTION A — (3 × 15 = 45 marks)

Answer any **THREE** questions.

1. Discuss various associations between record types with example.
2. Explain about hierarchical and relational data models with neat diagrams.
3. Illustrate Database Action Diagram (DAD) with suitable example.
4. Explain about IMS database description and IMS data manipulation.
5. What is authorization and authentication? Explain the access controls in a database.

SECTION B — (5 × 4 = 20 marks)

Answer any **FIVE** questions from the following.

6. Write about direct access file organization with neat sketch.
7. Explain about ring and multi-list data structures.
8. Describe various symbols used to represent E-R diagrams.
9. Describe the classification of data models based on their level of usage data.
10. Describe 3rd normal form and BCNF with example.
11. What is use of DROP VIEW and CREATE INDEX-ON commands of interactive SQL.

12. What is a transaction? Explain the ACID properties.
13. Write about different relational algebra operations.

SECTION C — (5 × 1 = 5 marks)

Answer ALL questions.

14. Define schema and instance.
 15. What is an expert system?
 16. Give two DCL commands.
 17. Define database failure.
 18. What is the need of normalization?
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M.C.A. DEGREE EXAMINATION, DECEMBER 2019.

First Year

ACCOUNTS AND FINANCE

Time : Three hours

Maximum : 70 marks

SECTION A — (3 × 15 = 45 marks)

Answer any THREE questions.

1. Explain the different types of subsidiary books and its advantages.
2. Discuss various basis of classification of cost and various types of costs?
3. What do you mean by finance? Explain various finance functions in detail.
4. What is Budgetary Control? Explain briefly its advantages and limitations.
5. Define Ratio Analysis. Write the advantages and limitations of Ratio Analysis.

SECTION B — (5 × 4 = 20 marks)

Answer any FIVE questions.

6. Advantages of Double Entry System.
7. Meaning of Journal and Ledger.
8. Accounting Concepts.
9. Bank Reconciliation Statement.
10. Difference between Funds flow statement and Cash flow statement.
11. Objectives of Trial balance.
12. Balance sheet
13. Liquidity Ratios

SECTION C — (5 × 1 = 5 marks)

Answer ALL questions.

14. Finance Manager
 15. Cost Accounting
 16. Master Budget
 17. Bank Overdraft
 18. Inventory Turnover Ratio
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First Year

DISCRETE MATHEMATICS

Time : Three hours

Maximum : 70 marks

SECTION A – (3 × 15 = 45 marks)

Answer any THREE questions.

1. (a) Prove the logical equivalence $(p \rightarrow (q \rightarrow r)) \equiv ((p \rightarrow q) \rightarrow (p \rightarrow r))$.
(b) Let $A = \begin{bmatrix} 1 & a \\ 0 & 1 \end{bmatrix}$ be a matrix. Prove by principle of mathematical induction $A^n = \begin{bmatrix} 1 & an \\ 0 & 1 \end{bmatrix}$.
2. (a) Let $A = \{1, 2, 3, \dots, 19, 20\}$ and R be the equivalence relation on A defined by aRb if and only if $a - b$ is divisible by 5. Find the partition of A induced by R .
(b) If $f : A \rightarrow B$ and $g : B \rightarrow C$ are bijective functions then $(gof)^{-1} = f^{-1}og^{-1}$.
3. (a) Determine the co-efficient of x^{20} in $(x^2 + x^3 + x^4 + x^5 + x^6)^5$.
(b) Solve the following recurrence relation using generating function:
$$\alpha_n - 2\alpha_{n-1} + \alpha_{n-2} = 2^{n-2} \text{ for } n \geq 2 \text{ and } \alpha_0 = 1, \alpha_1 = 5.$$
4. (a) Let G be the set of all non-zero real numbers, for $a * b = \frac{ab}{2}$, show that $(G, *)$ is an Abelian group.
(b) The generator matrix for an encoding function $E : Z_2^3 \rightarrow Z_2^6$ is given by $G = \begin{bmatrix} 1 & 0 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 1 & 0 & 1 \end{bmatrix}$. Find the code words assigned to 110 to 010. Also obtain the associated parity check.
5. (a) Determine whether the Posets $(\{1, 2, 3, 4, 5\}, |)$ and $(\{1, 2, 4, 8, 16\}, |)$ are lattices. Here the relation ' $|$ ' implies "divides".
(b) Simplify the Boolean expression $a'b'c + ab'c + a'b'c'$ using Boolean algebra identities

SECTION B – (5 × 4 = 20 marks)

Answer any FIVE question from the following.

6. Show that $(p \wedge q) \rightarrow (p \vee q)$ is a tautology.
7. There are 40 computer programmers for a job. 25 know Java, 28 know Oracle and 7 know neither language. Using principle of inclusion exclusion find how many know both languages.
8. If I be the set of integers, find whether $f : I \rightarrow 1$ defined by $f(x) = x^3$ is one-to-one, onto or both.
9. Find the transitive closure of relation R on the set $\{a, b, c\}$, whose relation matrix M_R is given as
$$\begin{bmatrix} 1 & 0 & 1 \\ 1 & 1 & 0 \\ 1 & 1 & 1 \end{bmatrix}.$$
10. Solve the recurrence relation $a_{n+1} - a_n = 3n^2 - n, n \geq 0, a_0 = 3$.
11. From 6 boys and 4 girls, 5 are to be selected for admission for a particular course. In how many ways can this be done if there must be exactly 2 girls?
12. For a group ' G ' with a and b as elements of G , show that
 - (a) $(a^{-1})^{-1} = a$
 - (b) $(ab)^{-1} = b^{-1}a^{-1}$.
13. Express the Boolean expression $xyz' + y'z + xz'$ in a sum of product form.

SECTION C — (5 × 1 = 5 marks)

Answer ALL questions.

14. Define rule of inference.
 15. Define binary relation.
 16. Define semigroup and monoid.
 17. Define Lattice.
 18. Define recurrence relation.
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