

(DMCA101)

M.C.A. DEGREE EXAMINATION, MAY - 2017

First Year

INFORMATION TECHNOLOGY

Time : 3 Hours

Maximum Marks : 70

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**SECTION - A**

(3 × 15 = 45)

**Answer any three of the following**

- Q1)** Discuss business pressures and responses in today's information age.
- Q2)** Describe the components of CPU and how the CPU is interconnected with I/O and memory.
- Q3)** Discuss about evolution of programming languages and their features.
- Q4)** Explain the architecture of database management system and also describe the advantages of DBMS.
- Q5)** Discuss various services provided by internet and also give operations on internet.

**SECTION - B**

(5 × 4 = 20)

**Answer any five of the following**

- Q6)** What are the basic components of information systems?
- Q7)** List the major career paths in IT.
- Q8)** Write not on random access memory and read only memory.
- Q9)** Describe about different system software's
- Q10)** Write short notes on data warehouses.
- Q11)** Describe different types of data transmission.

**Q12)** Write about star and ring network topologies.

**Q13)** Describe various internet challenges.

**SECTION - C**  
**Answer all questions**

**(5 × 1 = 5)**

**Q14)** What is role of ISD?

**Q15)** List down various units of memory.

**Q16)** Define operating system.

**Q17)** Define protocol

**Q18)** Define intranet.



**(DMCA102)**

**M.C.A. DEGREE EXAMINATION, MAY - 2017**

**(First Year)**

**PROGRAMMING WITH C++**

**Time : 3 Hours**

**Maximum Marks : 70**

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**SECTION - A**

**(3 × 15 = 45)**

**Answer three questions from the following**

- Q1)** Discuss the features of C++ programming and also differentiate C and C++.
- Q2)** What is friend function? What are the characteristics of friend function? Give the example of friend function.
- Q3)** Explain parameter passing mechanism through functions and function overloading.
- Q4)** What is exception? Explain the implementation of exception handling mechanism in C++.
- Q5)** Discuss about how to create and invoking of class template and function template.

**SECTION - B**

**(5 × 4 = 20)**

**Answer any five of the following**

- Q6)** Describe different conditional statements in C++.
- Q7)** List down various data types allowed in C++.
- Q8)** What are abstract classes? Explain their use in C++.
- Q9)** Explain copy constructor with suitable example.
- Q10)** How to implement multiple inheritance in C++?
- Q11)** Explain static members of a class. Write a C++ program to describe them.

**Q12)** How will you access a virtual function through a base class reference?

**Q13)** Explain user - defined manipulator with an example.

**SECTION - C**  
**Answer all questions**

**(5 × 1 = 5)**

**Q14)** Define function overloading.

**Q15)** Define encapsulation.

**Q16)** What is the purpose of scope resolution operator?

**Q17)** Define constructor.

**Q18)** Define vector.



**(DMCA103)**

**MCA DEGREE EXAMINATION, MAY - 2017**  
**First Year**  
**Computer Organization**

**Time : 3 Hours**

**Maximum Marks : 70**

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**Section – A**

**Answer any three questions**

**[3 × 15 = 45]**

- Q1)** Explain about the organization of an Embedded System.
- Q2)** Explain about PCI Physical and Logical Architecture.
- Q3)** Explain about RAID.
- Q4)** Explain about Floating-Point Multiplication.
- Q5)** Explain about Internal Structure of the CPU.

**Section – B**

**Answer any five questions**

**[5 × 4 = 20]**

- Q6)** Explain about the Top-level structure of a computer.
- Q7)** Explain about the instruction execution rate.
- Q8)** List and explain the QPI protocol layers.
- Q9)** Explain about CD Operation.
- Q10)** Briefly explain the following representations: sign magnitude, twos complement and biased.

**Q11)** What are the basic elements of floating-point addition and subtraction?

**Q12)** Explain instruction pipeline operation with timing diagram.

**Q13)** How are history bits used for branch prediction?

**Section – C**

**Answer all questions**

**[5 × 1 = 5]**

**Q14)** What is the key distinguishing feature of a microprocessor?

**Q15)** What is the benefit of using a multiple-bus architecture compared to a single-bus architecture?

**Q16)** What is the typical disk sector size?

**Q17)** What are the four essential elements of a number in floating-point notation?

**Q18)** What are the general roles performed by processor registers?



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M.C.A. DEGREE EXAMINATION, MAY - 2017

(First Year)

DATA STRUCTURES

Time : 3 Hours

Maximum Marks : 70

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**SECTION - A**

(3 × 15 = 45)

**Answer any three questions**

- Q1)** What is a structure? How to create, store and access structure elements? Illustrate with suitable example?
- Q2)** Write an algorithm for insertion and deletion of a node from double linked list and also discuss applications of linked lists.
- Q3)** Write pseudo code of FRONT ( ) and REAR ( ) functions for the queue using arrays.
- Q4)** Draw a binary search tree whose elements are inserted in the following order:  
50, 70, 90, 93, 100, 20, 10, 12, 9, 25, 51, 15, 95.  
And also mention its subroutines.
- Q5)** Explain quick sort algorithm and also sort the following list of element by quick sort procedure.  
67, 12, 89, 26, 38, 45, 22, 79, 53, 9, 61.

**SECTION - B**

(5 × 4 = 20)

**Answer any five questions**

- Q6)** Write short notes on pointers.
- Q7)** Write about linear and non-linear data structures.
- Q8)** How can stacks be used to check whether an expression is correctly parenthesized or not.
- Q9)** Briefly explain about circular queue.

**Q10)** Construct binary tree from the following information:

In-order : 50, 10, 30, 90, 60, 80, 40, 20, 70

Pre-order : 60, 10, 50, 90, 30, 40, 80, 70, 20

**Q11)** Write an algorithm to test whether a given binary tree is a binary search tree.

**Q12)** Write about selection sort procedure.

**Q13)** Implement binary search using recursion and find its complexity.

**SECTION - C**  
**Answer all questions**

**(5 × 1 = 5)**

**Q14)** How to create dynamic array?

**Q15)** Define priority queue.

**Q16)** Define complete binary tree.

**Q17)** Define recursion.

**Q18)** Define in-order and post-order of tree traversing.





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M.C.A. DEGREE EXAMINATION, MAY - 2017

First Year

Operating Systems

Time : 3 Hours

Maximum Marks : 70

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Section – A

Answer any three questions

[3 × 15 = 45]

- Q1)** What are the system components of operating system and explain each of them in detail.
- Q2)** 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, turn around time for each process. Also calculate Average waiting time, average turn around time for above situation.

- Q3)** Explain about the techniques for structuring the page table.
- Q4)** What is meant by RAID levels? Which level is used for what purpose?
- Q5)** Discuss various security issues in modern operating system.

**Section – B**

**Answer any five questions**

**[5 × 4 = 20]**

- Q6)** Describe batch processing and multi – processor operating systems.
- Q7)** Write about process state model with state diagram.
- Q8)** Briefly explain about long and short term scheduling.
- Q9)** Explain the schemes for defining the logical structure of a directory.
- Q10)** Explain necessary condition for deadlock to occur?
- Q11)** State critical section problem. Describe the basic requirements of critical section problem solution.
- Q12)** Write short demand paging.
- Q13)** Explain the classic problems of synchronization.

**Section – C**

**Answer all questions**

**[5 × 1 = 5]**

- Q14)** Define thread.
- Q15)** Define semaphore.
- Q16)** What is virtual memory?
- Q17)** Define page fault.
- Q18)** Define worm and virus.



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M.C.A. DEGREE EXAMINATION, MAY - 2017

First Year

Data base Management Systems

Time : 3 Hours

Maximum Marks : 70

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**Section – A**

**Answer any three questions**

**[3 × 15 = 45]**

- Q1)** Discuss features of database systems and file systems and also describe the advantages of database systems over file systems.
- Q2)** Discuss about inter record data structures with suitable example.
- Q3)** Illustrate guidelines for mapping from conceptual data model to relational and network data models.
- Q4)** Explain about IMS database description and IMS data manipulation.
- Q5)** Discuss about concurrency control and database recovery mechanisms.

**Section – B**

**Answer any five questions**

**[5 × 4 = 20]**

- Q6)** Describe the classifications of information systems.
- Q7)** Briefly explain about sequential file organization.
- Q8)** Write about physical address pointer and logical key pointer.
- Q9)** Briefly explain about hierarchical data model with example.
- Q10)** Explain about 1<sup>st</sup> and 2<sup>nd</sup> normal forms.

**Q11)** Write about database action diagram.

**Q12)** Describe the roles of DBA.

**Q13)** Describe any four relational calculus commands.

**Section – C**

**Answer all questions**

**[5 × 1 = 5]**

**Q14)** What is an expert system?

**Q15)** What is meant by one – to – one association?

**Q16)** Give the DDL commands.

**Q17)** Define entity and relation.

**Q18)** Define database recovery.



(DMCA107)

M.C.A. DEGREE EXAMINATION, MAY - 2017

First Year

ACCOUNTS & FINANCE

Time : 3 Hours

Maximum Marks : 70

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**SECTION - A**

(3 × 15 = 45)

**Answer any THREE of the following**

- Q1)** What are the advantages of Double Entry System of Accounting?
- Q2)** Prepare a model of Trial Balance of your choice.
- Q3)** Define 'Cost'. Write about the classification of costs.
- Q4)** What are the functions of Finance?
- Q5)** What are the determinants of Working Capital?

**SECTION - B**

(5 × 4 = 20)

**Answer any FIVE of the following**

- Q6)** What is a Subsidiary Book?
- Q7)** What do you understand by Ledger?
- Q8)** What is BRS?
- Q9)** Prepare a model of Trading A/c.
- Q10)** What is Marginal Cost?
- Q11)** What is Budgetary Control?
- Q12)** Who is a Financial Analyst?
- Q13)** Define 'Working Capital'.

**SECTION - C**  
**Answer ALL the questions**

**(5 × 1 = 5)**

**Q14)** Definition of 'Accounting'.

**Q15)** Pass Book.

**Q16)** Cash Budget.

**Q17)** Finance Manager.

**Q18)** Liquidity Ratio.



(DMCA108)

M.C.A. DEGREE EXAMINATION, MAY - 2017

First Year

DISCRETE MATHEMATICS

Time : 3 Hours

Maximum Marks : 70

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**SECTION - A**

(3 × 15 = 45)

**Answer any three of the following**

- Q1)** a) Show that  $(p \rightarrow (q \rightarrow r)) \equiv ((p \rightarrow q) \rightarrow (p \rightarrow r))$  .  
b) Write a DNF of the following statement :  $\neg\{\neg(p \leftrightarrow q) \wedge r\}$  .
- Q2)** a) On the set  $Z$  of all integers, a relation  $R$  is defined by  $aRb$  if and only if  $a^2 = b^2$ . Verify that  $R$  is equivalence relation.  
b) Let  $R$  be a binary relation define as  $R = \{(a, b) \in \mathbb{R} : a - b \leq 3\}$  , determine whether  $R$  is reflexive, symmetric and transitive.
- Q3)** a) A question paper contains 10 questions of which 7 are to be answered. In how many ways a student can select the 7 questions.  
i) If he select 3 questions from the first five and 4 from the last five.  
ii) If he should select at least 3 from the first five.  
b) Solve recurrence relation  $a_{n+1} - a_n = 3n^2 - n$  for  $n \geq 0, a_0 = 3$  .
- Q4)** a) In any group  $(G, *)$  , by proving the inverse of every element is unique. Show that  $(a * b)^{-1} = b^{-1} * a^{-1}, \forall a, b \in G$  .  
b) Prove the laws of idempotent, commutative, associative and absorption in a lattice.
- Q5)** Using generating function, find the number of integer solutions of the equation:  
 $x_1 + x_2 + x_3 + x_4 = 25$  .

**SECTION - B**

**(5 × 4 = 20)**

**Answer any five from the following**

**Q6)** Show that  $\forall x (P(x) \wedge Q(x)) \equiv \forall x P(x) \wedge \forall x Q(x)$ .

**Q7)** Quantify the following arguments into predicate form:

- a) Some integers are divisible by 5.
- b) All real numbers are complex numbers.
- c) Every living thing is a plant or an animal.
- d) Everybody likes somebody.

**Q8)** The functions  $f: \mathbb{R} \rightarrow \mathbb{R}$  and  $g: \mathbb{R} \rightarrow \mathbb{R}$  are defined by  $f(x) = 3x + 7$  for all  $x \in \mathbb{R}$  and  $g(x) = x(x^3 - 1)$  for all  $x \in \mathbb{R}$  verify that  $f$  is one-to-one but  $g$  is not.

**Q9)** From 6 boys and 4 girls, 5 are to be selected for admission for a particular course. In How many ways can be done if there must be exactly 2 girls?

**Q10)** Prove the following identify :  $C(n+1, r) = C(n, r-1) + C(n, r)$ .

**Q11)** Find the recurrence relation and initial condition for the following sequence:

0, 2, 6, 12, 20, 30, 42.

**Q12)** Draw the Hasse diagram of the relation  $R$  on  $A = \{1, 2, 3, 4, 5\}$  whose matrix as given below:

$$\begin{vmatrix} 1 & 0 & 1 & 1 & 1 \\ 0 & 1 & 1 & 1 & 1 \\ 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{vmatrix}.$$

**Q13)** On the set  $Q$  of all rational numbers, the operation  $*$  is defined by  $a * b = a + b - ab$ . Show that, under this operation  $Q$  forms commutative monoid.



**SECTION - C**  
**Answer all questions**

**(5 × 1 = 5)**

**Q14)** Define tautology of logical expression.

**Q15)** Define binary relation.

**Q16)** Define first order recurrence relations.

**Q17)** Define monoid.

**Q18)** Define distributed lattice.

