

**M.Sc. (Previous) DEGREE EXAMINATION, MAY – 2015**

**First Year**

**COMPUTER SCIENCE**

**(Paper - I : Data Structures**

**Time : 3 Hours**

**Maximum Marks: 75**

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**SECTION - A**

**Answer any THREE of the following**

**(3×15 = 45)**

- 1) What is Double linked list? Explain its operations in detail.
- 2) What is a Queue? Explain various Queue structures with neat illustration.
- 3) Explain the operations of Binary tree in detail.
- 4) Design and develop a C++ program to perform Quick sort operation.
- 5) Discuss about minimum spanning tree in detail.

**SECTION – B**

**Answer any FIVE questions**

**(5×5 = 25)**

- 6) What is Data structure? Write about the overview of data structure.
- 7) Explain about the applications of stack.
- 8) Discuss about the representation of Binary tree.
- 9) Write a short notes on heap trees.
- 10) Explain about shell sort with example.
- 11) Write about the sorting of large objects.

12) Discuss about the representation of graphs.

13) Write a short notes on shortest path problem.

**SECTION-C**

**Answer all questions**

**(5×1 = 5)**

14) Define stack.

15) What is a linked list.

16) Define Full & complete binary tree.

17) What is Binary search tree?

18) Define graph.



M.Sc. (Previous) DEGREE EXAMINATION, MAY – 2015

First Year

COMPUTER SCIENCE

Paper - II : Object Oriented Programming

Time : 3 Hours

Maximum Marks: 75

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**SECTION - A**

**Answer any THREE questions**

**(3×15 = 45)**

- 1) a) Explain about control structures in detail.  
b) Write C++ program using control structures.
- 2) Explain about object oriented programming concepts in detail.
- 3) What is inheritance? Discuss about types of Inheritance in detail with example.
- 4) Describe about different types of operator Overloading with example program.
- 5) Explain about Exception handling with an Illustration.

**SECTION – B**

**Answer any FIVE questions**

**(5×5 = 25)**

- 6) What is an Array? Explain.
- 7) Discuss about function Overloading.
- 8) What are the string handling functions? Discuss.
- 9) Describe classes, objects and data abstraction.
- 10) Write about polymorphism in detail.

- 11) Discuss about virtual functions.
- 12) Write a C++ program using files.
- 13) Describe about Templates in detail.

**SECTION-C**

**Answer all questions**

**(5×1 = 5)**

- 14) What is inline function?
- 15) Define Data Encapsulation.
- 16) What is a pointer?
- 17) Define data type.
- 18) What do you mean by call by address.



M.Sc. (Previous) DEGREE EXAMINATION, MAY – 2015

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COMPUTER SCIENCE

Paper - III : Computer Organization

Time : 3 Hours

Maximum Marks: 75

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**SECTION - A**

**Answer any THREE Questions**

**(3×15 = 45)**

- 1) Explain about different logic gates with diagrams.
- 2) Explain about multiplexer and demultiplexer?
- 3) What is a bus structures? Explain different types.
- 4) What is a Register? Explain different types of registers.
- 5) Explain about memory hierarchy in detail with neat label diagram.

**SECTION – B**

**Answer any FIVE of the following**

**(5×5 = 25)**

- 6) Write about the sequential circuits.
- 7) What is a shift register? List out their types.
- 8) What is an Instruction code.
- 9) Write a note on addressing modes.
- 10) Write about the processor & stack organization.

*11)* Write a note on Peripheral devices.

*12)* What is a Priority In Interrupts.

*13)* Write about associative memory.

**SECTION-C**

**Answer all questions**

**(5×1 = 5)**

*14)* Define a flip flop and latch.

*15)* Define encoder.

*16)* List out interrupts.

*17)* Program control.

*18)* Main memory



**SECTION - A**

**Answer any THREE Questions**

**(3×15 = 45)**

- 1) a) Show that  
$$\left( (p \vee q) \wedge \neg (\neg p \wedge (\neg q \vee \neg r)) \right) \vee (\neg p \wedge \neg q) \vee (\neg p \wedge \neg r)$$
 is a tautology.
- b) Obtain the principle conjunctive normal form of the formula S given by  
$$(\neg p \rightarrow r) \wedge (q \vee p) .$$
- 2) a) Show that  $r \wedge (p \vee q)$  is a valid conclusion from the premises  $p \vee q$ ,  $q \rightarrow r$ ,  $p \rightarrow m$  and  $\neg m$ .
- b) Let  $R = \{(1,2), (3,4), (2,2)\}$  and  $S = \{(4,2), (2,5), (3,1), (1,3)\}$ . Find  $\text{RoS}$ ,  $\text{SoR}$ ,  $\text{Ro}(\text{SoR})$ ,  $(\text{RoS})\circ\text{R}$ ,  $\text{RoR}$ ,  $\text{SoS}$  and  $\text{RoRoR}$ .
- 3) a) State and explain Recurve theorem.
- b) Prove that every finite group of order  $n$  is isomorphic to a permutation group of degree  $n$ .
- 4) a) Let  $(L, \leq)$  be a lattice in which  $*$  and  $\oplus$  denote the operations of meet and join respectively. For any  $a, b \in L$  Prove that  
$$a \leq b \Leftrightarrow a * b = a \Leftrightarrow a \oplus b = b$$
- b) Obtain the product – of - sums canonical forms of the Boolean expressions

- i)  $x_1 * x_2$
- ii)  $x_1 \oplus x_2$

- 5) a) Prove that a complete graph  $K_n$  is planar iff  $n \leq 4$ .
- b) Prove that every simple planar graph is 5-colorable.

### SECTION – B

Answer any FIVE of the following

(5×5 = 25)

- 6) Construct the truth table for the formula

$$\neg(p \vee (q \wedge r)) \quad ((p \vee q) \wedge (p \vee r))$$

- 7) Let  $s$  be any state in a finite-state machine and  $x$  and  $y$  be any words. Then prove that  $S(s, xy) = S(S(s, x), y)$  and  $\lambda(s, xy) = \lambda(S(s, x), y)$ .

- 8) If  $A = \{\alpha, \beta\}$  and  $B = \{1, 2, 3\}$ , what are  $A \times B$ ,  $B \times A$ ,  $A \times A$ ,  $B \times B$  and  $(A \times B) \cap (B \times A)$ ?

- 9) What is Recursive subroutine.

- 10) Define Monoid and submonoid.

- 11) Define the terms Lattice, sublattice and Lattice homomorphism.

- 12) Define the terms, Graph, Bipartite graph and planar graph.

- 13) Define Adjacency matrix of a graph  $G$  and give an example.

### SECTION-C

Answer all questions

(5×1 = 5)

- 14) Define the connective conjunction.

- 15) Define poset.

*16)* Define Hamiltonian graph.

*17)* Write two properties of Lattices.

*18)* Define Euler's circuit.



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COMPUTER SCIENCE

Paper - V : Software Engineering

Time : 3 Hours

Maximum Marks: 75

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**SECTION - A**

**Answer any THREE Questions**

**(3×15 = 45)**

- 1) a) Generate the important tasks of software engineering.  
b) Discuss about the types of process models of list out merits & demerits of each model.
- 2) Describe the basic concepts & principles of requirements analysis. Also explain Data Modeling & class based Modeling.
- 3) a) Discuss about architectural design & its significance.  
b) What is pattern based software design?
- 4) Specify the design issues involved with interface design & explain web application design issues.
- 5) a) Explain the testing strategies done to object oriented software.  
b) Discuss Reengineering used in software maintenance.

**SECTION – B**

**Answer any FIVE of the following**

**(5×5 = 25)**

- 6) List the software characteristics.
- 7) Explain in brief system design concepts.

- 8) Discuss the concepts of modular design.
- 9) Give the merits & demerits of Agile process model.
- 10) List the types of project metrics.
- 11) Define regression testing.
- 12) Discuss the importance of prototype model.
- 13) Define and differentiate product & process metrics.

**SECTION-C**

**Answer all questions**

**(5×1 = 5)**

- 14) Define white box testing techniques.
- 15) What is SADT?
- 16) Define software myth.
- 17) What is RAD?
- 18) What is software product?



**SECTION - A**

**Answer any THREE Questions**

**(3×15 = 45)**

- 1) a) Discuss a bout the goals of Distributed Systems.  
b) Generate about inherent limitations of distributed systems.
- 2) Discuss in detail deadlock concepts in distributed system.
- 3) a) Explain in detail model of Processor failure.  
b) Discuss the algorithms for implementing distributed should memory.
- 4) Generate the design issues of distributed file system and trends in distributed system.
- 5) a) Explain Kurnel Modulus in detail.  
b) Write about RAID in detail.

**SECTION – B**

**Answer any FIVE of the following**

**(5×5 = 25)**

- 6) Explain in detail Hardware concepts.
- 7) Discuss about message passing model in detail.
- 8) What is election algorithm?
- 9) Give the characteristics of deadlock occurance & explain with WFG.

- 10) Discuss about critical-section problem in detail.
- 11) Explain in detail processor allocation.
- 12) Discuss recovery in concurrent systems.
- 13) Write about mounting & catching for building distributed file system.

**SECTION-C**

**Answer all questions**

**(5×1 = 5)**

- 14) What is fragmentation?
- 15) Define process.
- 16) What is a protocol?
- 17) Define stream.
- 18) Explain Virtual memory in brief.



(DMCS 07)

M.Sc. (Previous) DEGREE EXAMINATION, MAY – 2015

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COMPUTER SCIENCE

Paper - VII : Data base Management Systems

Time : 3 Hours

Maximum Marks: 75

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**SECTION - A**

**Answer any THREE of the following**

**(3×15 = 45)**

- 1) Discuss about database architecture, structure, history & give applications of database system.
- 2) Explain.
  - a) Three schema architecture
  - b) High-level conceptual data models for data base design.
- 3) Explain in detail embedded and dynamic SQL. with example.
- 4) What is normalization? Explain in detail about normalization with examples.
- 5) Explain relational data base management system features of Oracle.

**SECTION – B**

**Answer any FIVE of the following**

**(5×5 = 25)**

- 6) Differentiate data base systems with file system.
- 7) Explain about data independence.
- 8) What is E-R diagram? Explain.
- 9) What is Query processing? Explain with example.

- 10) Explain lossless Join decomposition.
- 11) Define domain relational calculus.
- 12) Explain data base design methodology.
- 13) Discuss about concurrency protocols in detail.

**SECTION-C**

**Answer all questions**

**(5×1 = 5)**

- 14) What is SQL?
- 15) Define entity & give types.
- 16) What is data dictionary?
- 17) What is RAID?
- 18) Define deadlock.



M.Sc. (Previous) DEGREE EXAMINATION, MAY – 2015

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COMPUTER SCIENCE

Paper – VIII : Theory of Automata and Formal Language

Time : 3 Hours

Maximum Marks: 75

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**SECTION - A**

**Answer any THREE Questions**

**(3×15 = 45)**

- 1) a) Explain equivalence between NFA & OFA.  
b) Discuss about the conversion of NFA into DFA.
- 2) Explain about Target lanauages in detail.
- 3) Discuss about right linear, left linear and regular grammars.
- 4) Explain greibach Normal form in detail.
- 5) Explain about types of turing machines.

**SECTION – B**

**Answer any FIVE questions**

**(5×5 = 25)**

- 6) Write about fine automation model.
- 7) Describe Moore and Melay machines.
- 8) Discuss about pumping lemma.
- 9) Write a short notes push down automata.
- 10) Write about inter conversion.

- 11) Discuss about counter machine.
- 12) Write about linear bounded automata.
- 13) Discuss about free language.

**SECTION-C**

**Answer all questions**

**(5×1 = 5)**

- 14) Define string.
- 15) What is FSM?
- 16) Define CFL.
- 17) What is Turing Machine?
- 18) Define DPDA.



(DMCS 09)

M.Sc. (Previous) DEGREE EXAMINATION, MAY – 2015

First Year

COMPUTER SCIENCE

Paper – IX : Computer Networks

Time : 3 Hours

Maximum Marks: 75

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**SECTION - A**

**Answer any THREE Questions**

**(3×15 = 45)**

- 1) Explain about TCP/IP model in detail.
- 2) Explain about FTP and HTTP in detail.
- 3) Discuss about Multiplexing & Demultiplexing.
- 4) Describe about the hierarchial routing.
- 5) Explain about the techniques for error correction & error detection.

**SECTION – B**

**Answer any FIVE Questions**

**(5×5 = 25)**

- 6) Write a note on ISPs and NAPs.
- 7) Write about the e-mail in the internet.
- 8) What are the principles & services of network layer.
- 9) What is Routing? Explain its types in detail.
- 10) Write about the Internet protocol.
- 11) Write a note on Routing in the internet.

12) Write about the services of data link layer.

13) Write a note on multiple Access protocol.

**SECTION-C**

**Answer all questions**

**(5×1 = 5)**

14) What is network.

15) What is bridge & hubs.

16) Define Ethernet.

17) What is addressing.

18) Define IEEE 802.11 LANS.



M.Sc. (Previous) DEGREE EXAMINATION, MAY – 2015

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COMPUTER SCIENCE

Paper – X : Design & Analysis of Algorithms

Time : 3 Hours

Maximum Marks: 75

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**SECTION - A**

**Answer any THREE of the following**

**(3×15 = 45)**

- 1) Write the linear search algorithm and analyse for its best, worst and average case time complexities.
- 2) Distinguish between quick sort and merge sort, and arrange the following numbers in increasing order using merge sort (18,29,68,32,43,37,87,24,47,50).
- 3) Explain how dynamic programming is applied to solve travelling sales person problem, and analyse the complexity of algorithm.
- 4) With an example explain Graph-coloring problem.
- 5) Explain FIFO-Branch and Bound an LC-Branch and Bound methods.

**SECTION – B**

**Answer any FIVE of the following**

**(5×5 = 25)**

- 6) List all properties of asymptotic notations.
- 7) Construct unique binary tree using INORDER: 1,2,3, 4,5,7,8  
PREORDER: 5,2,1,4,3,8,7.
- 8) Prove that SAT (Satisfiability) in NP-Complete.

- 9) Define and differentiate Full Binary Tree and Complete Binary Tree with tree representations.
- 10) Sort the following elements using bubble sort 90,70,10,30,20.
- 11) Explain in detail the graph traversals.
- 12) Differentiate DFS and BFS search strategies.
- 13) Write an algorithm to implement stack operations with an example.

### **SECTION-C**

**Answer all of the following**

**(5×1 = 5)**

- 14) If  $F(n) = \log(n!)$  Big O ( $F(n)$ ) is?
- 15) Define live node and dead node?
- 16) What is Articulation point?
- 17) State general backtracking method?
- 18) Define Reducibility?

