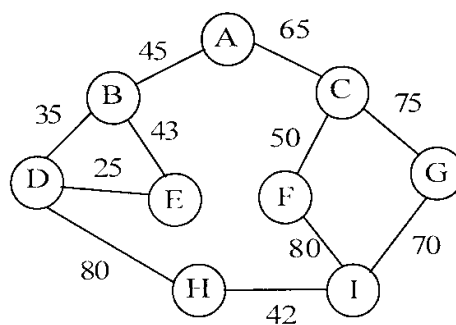


(DMCS01)

ASSIGNMENT-1  
M.Sc. DEGREE EXAMINATION, MAY – 2018  
COMPUTER SCIENCE  
First Year  
DATA STRUCTURES  
MAXIMUM MARKS:30  
Answer ALL Questions

- Q1)** Write the following subroutines of double linked list
- a) Insert a new node at the end
  - b) Delete the first node
  - c) Insert a node after a specific node
- Q2)** Describe various queue operations. How to implement queues using single linked lists.
- Q3)** Explain about linear and linked representation of binary tree with suitable example.
- Q4)** Consider the following list elements : 67, 12, 89, 26, 38, 45, 22, 79, 53, 9, 61 Sort these elements using heap sort.
- Q5)** What is minimum spanning tree? Construct Minimum Spanning Tree for the following graph using Prim's algorithm.



**Q6)** Describe the applications of queues.

**Q7)** Convert the following infix expression into prefix and post – fix notation.

$$(A + B * D)/(E - F) + G$$

**Q8)** Construct binary search tree for the following :

J, R, D, G, T, E, M, H, P, A, F, Q

**Q9)** Write short notes on B – trees.

**Q10)** What is meant by expression tree? Give suitable example.

**(DMCS01)**

**ASSIGNMENT-2**

**M.Sc. DEGREE EXAMINATION, MAY – 2018**

**COMPUTER SCIENCE**

**First Year**

**DATA STRUCTURES**

**MAXIMUM MARKS:30**

**Answer ALL Questions**

*Q1)* Describe various ways to representing graphs into computer memory.

*Q2)* Explain about Hamiltonian circuit with example.

*Q3)* Briefly explain about bucket sorting with example.

*Q4)* What is sparse matrix?

*Q5)* What is De – queue?

*Q6)* What is heap tree?

*Q7)* Define graph.

*Q8)* Define in – order and post – order of tree traversing.



**(DMCS02)**

**ASSIGNMENT-1**  
**M.Sc. DEGREE EXAMINATION, MAY – 2018**  
**COMPUTER SCIENCE**  
**First Year**  
**DATA STRUCTURES**  
**MAXIMUM MARKS:30**  
**Answer ALL Questions**

- Q1)** Discuss about different control structures used in C++.
- Q2)** What is the significance of function overloading? Write a program to calculate area of triangle, circle and rectangle by overloading the functions.
- Q3)** What is meant by class and object? Illustrate with an example the concept of data abstraction and message passing mechanism.
- Q4)** What is meant by exception? How to handle exceptions in C++? Describe different types of exceptions.
- Q5)** What are I/O streams in C++? Give the stream class hierarchy with syntax.
- Q6)** Give the differences between C and C++.
- Q7)** What are inline functions? What are the advantages of inline functions?
- Q8)** Explain static data members and static member functions.
- Q9)** List down any four string handling functions with its purpose.

**(DMCS02)**

**ASSIGNMENT-2**  
**M.Sc. DEGREE EXAMINATION, MAY – 2018**  
**COMPUTER SCIENCE**  
**First Year**  
**DATA STRUCTURES**  
**MAXIMUM MARKS:30**  
**Answer ALL Questions**

*Q10)* Briefly explain about multiple inheritance with example.

*Q11)* What is destructor? Give the example of destructors.

*Q12)* How to create function template? Give the example.

*Q13)* Describe the various file mode operations available.

*Q14)* What is use of scope resolution operator?

*Q15)* Define constructor.

*Q16)* Define late binding.

*Q17)* Define template.

*Q18)* Define operator overloading.



**(DMCS03)**

**ASSIGNMENT-1**  
**M.Sc. DEGREE EXAMINATION, MAY – 2018**  
**First Year**

**COMPUTER SCIENCE**  
**Computer Organization**  
**MAXIMUM MARKS:30**  
**Answer ALL Questions**

- Q1)** Design a Combinational Circuit that converts Binary Code to Excess-3 Code.
- Q2)** Explain about the RTL for Arithmetic and Logical Micro operations.
- Q3)** Explain about the design of Address Sequence generator in microprogrammed control.
- Q4)** Explain about the Computer Instructions.
- Q5)** Explain about Associate Memory in detail.
- Q6)** Explain about Shift Registers.
- Q7)** Explain about Error Detection Codes.

**(DMCS03)**

**ASSIGNMENT-2**  
**M.Sc. DEGREE EXAMINATION, MAY – 2018**  
**First Year**  
**COMPUTER SCIENCE**  
**Computer Organization**  
**MAXIMUM MARKS:30**  
**Answer ALL Questions**

- Q1)* Explain about the ALU.
- Q2)* Explain about Timing and Control Unit of basic computer.
- Q3)* Explain about Control Memory.
- Q3)* Explain about stack organization.
- Q4)* Explain about the asynchronous data transfer.
- Q5)* Explain about memory hierarchy?
- Q6)* Explain about one's Complement.
- Q7)* What is a Micro Operation?
- Q8)* What is the purpose of Program Counter?
- Q9)* Explain about floating point numbers.
- Q10)* What is Cache Memory?

**(DMCS04)**

**ASSIGNMENT-1**  
**M.Sc. DEGREE EXAMINATIONS, MAY - 2018**

**(First Year)**

**COMPUTER SCIENCE**

**Discrete Mathematical Structures**

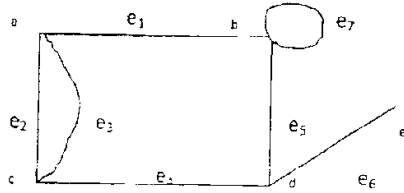
**MAXIMUM MARKS:30**

**Answer ALL Questions**

- Q1)** a) Prove that, for any three propositions  $p, q, r$  the compound proposition  
$$[(p \rightarrow q) \wedge (q \rightarrow r)] \rightarrow (p \rightarrow r)$$
is tautology  
b) Show that  $R \rightarrow S$  can be drawn from the premises  $P \rightarrow (Q \rightarrow S)$ ,  $\neg R \vee P$  and  $Q$ .
- Q2)** a) State and describe rules of inference.  
b) Show that the statement “ $\sqrt{2}$  irrational” by prove by contradiction.
- Q3)** a) Let  $A = \{a, b, c\}$  be a set and relation  $R$  on  $A$  is as  $= \{(a, a), (a, b), (b, c), (c, c)\}$ . Is  $R$   
i) Reflexive  
ii) Symmetric  
iii) Transitive  
b) If  $R$  and  $S$  are equivalence relations on a set  $A$ . Prove that  $R \cap S$  is an equivalence Relation
- Q4)** a) Prove that the intersection of any two subgroups of a group  $G$  is again subgroup of  $G$ .  
b) Show that in any Boolean algebra,  $(a+b)(a'+c) = ac + a'b + bc$ .



**Q5) a)** Find the Adjacency matrix and Incidence matrix of the following graph



b) State and explain graph coloring problem.

**Q6)** Write the statement in symbolic form then negate statements.

“Some Drivers do not obey the speed limit”

**Q7)** Using truth table prove that  $P \rightarrow Q \equiv \neg P \vee \neg Q$

**(DMCS04)**

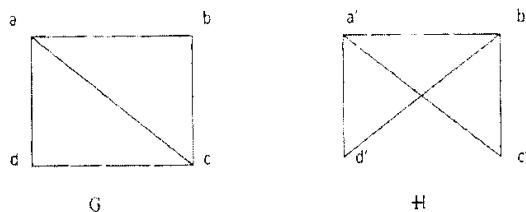
**ASSIGNMENT-2**  
**M.Sc. DEGREE EXAMINATIONS, MAY - 2018**  
**(First Year)**

**COMPUTER SCIENCE**  
**Discrete Mathematical Structures**

**MAXIMUM MARKS:30**

**Answer ALL Questions**

- Q1)** Let  $X = \{1, 2, 3, 4, 5, 6\}$  and  $R$  be a relation defined as  $(x, y) \in R$  if and only if  $x - y$  is divisible by 3. Find the elements of relation of  $R$ .
- Q2)** If  $A$  and  $B$  are any two sets, then  $A \cap (B - A) = \Phi$ .
- Q3)** In a lattice  $(L, \leq, \wedge, \vee)$ , state and prove the laws idempotent, commutative.
- Q4)** Prove that the intersection of any two subgroups of a group  $G$  is again in subgroup of  $G$ .
- Q5)** Check whether the graphs  $G$  and  $H$  are Isomorphic or not



- Q6)** Explain about Chromatic number with example.
- Q7)** Define clause form.
- Q8)** What is Hasse diagram?
- Q9)** Define homomorphism.
- Q10)** Define cyclic graph
- Q11)** Define Eulerian path

**(DMCS05)**

**ASSIGNMENT-1**  
**M.Sc. DEGREE EXAMINATION, MAY – 2018**  
**First Year**  
**Computer Science**  
**SOFTWARE ENGINEERING**  
**MAXIMUM MARKS:30**  
**Answer ALL Questions**

- Q1)** Explain about spiral model and incremental model with neat sketch.
- Q2)** Explain in detail about structural modeling and data modeling.
- Q3)** Discuss about user interface design with the help of golden rules.
- Q4)** Explain alpha, beta and smoke testing.
- Q5)** Explain in detail about rapid proto typing techniques.
- Q6)** Briefly write about software myths.
- Q7)** Describe the fundamental activities of software process.
- Q8)** How do you measure the software quality? Briefly explain.
- Q9)** Briefly explain about functional and non – functional requirements.

**(DMCS05)**

**ASSIGNMENT-2**  
**M.Sc. DEGREE EXAMINATION, MAY – 2018**  
**First Year**  
**Computer Science**  
**SOFTWARE ENGINEERING**  
**MAXIMUM MARKS:30**  
**Answer ALL Questions**

- Q1)* Describe various types coupling.
- Q2)* Write about different levels of DFD's.
- Q3)* List the errors that can be found using black box testing.
- Q4)* What are the various types of system testing?
- Q5)* What is cohesive module?
- Q6)* What is CMM?
- Q7)* Define data dictionary
- Q8)* Define vertical partitioning.
- Q9)* What is cyclomatic complexity?



**(DMCS07)**

**ASSIGNMENT-1**  
**M.Sc. DEGREE EXAMINATION, MAY – 2018**

**First Year**

**COMPUTER SCIENCE**

**Database Management Systems**

**MAXIMUM MARKS:30**

**Answer ALL Questions**

**Q1)** Explain the following with their advantages and disadvantages.

- i) Hierarchical database model
- ii) Network database model
- iii) Relational database model.

**Q2)** What is Relational Algebra? Enlist and explain the fundamental operation of relational algebra with suitable example.

**Q3)** Discuss aggregate functions and nested queries in SQL with syntax.

**Q4)** Explain about structures of magnetic disks and RAID levels.

**Q5)** a) Explain various deadlock prevention methods.

b) Write about the view serializability with example.

**Q6)** Explain in detail the duties of DBA.

**Q7)** Draw symbols for following in ER diagram.

**Q8)** Explain Database Triggers.

**(DMCS07)**

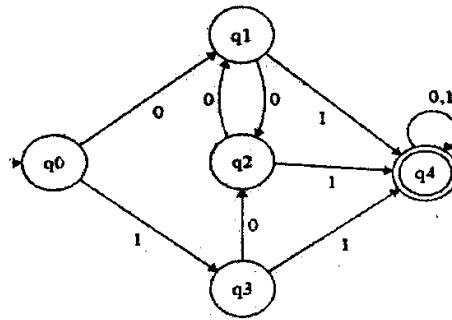
**ASSIGNMENT-2**  
**M.Sc. DEGREE EXAMINATION, MAY – 2018**  
**First Year**  
**COMPUTER SCIENCE**  
**Database Management Systems**  
**MAXIMUM MARKS:30**  
**Answer ALL Questions**

- Q1)* What is functional dependency? Explain its usage in database design. .
- Q2)* Write about static and dynamic hashing.
- Q3)* What is a transaction? Explain its four important properties.
- Q4)* Explain 1NF, 2NF and 3NF with example.
- Q5)* Briefly explain about time stamp based protocols.
- Q6)* Define primary key.
- Q7)* Define instance and schema.
- Q8)* Define atomicity.
- Q9)* What are the DCL commands?
- Q10)* What are the Correlated Queries?

(DMCS 08)

**ASSIGNMENT-1**  
**M.Sc. DEGREE EXAMINATION, MAY – 2018**  
**First Year**  
**COMPUTER SCIENCE**  
**Theory of Automata and Formal Languages**  
**MAXIMUM MARKS:30**  
**Answer ALL Questions**

**Q1)** Write a procedure to minimizing the DFA and also minimize the following DFA



**Q2)** Construct FA's for the following regular expressions:

- a)  $(0+1)^*(00+11)(0+1)^*$
- b)  $(10+1)^*01$

**Q3)** Let G be the grammar as  $S \rightarrow aB|bA$ ,  $A \rightarrow a|aS|bAA$ ,  $B \rightarrow b|bS|aBB|$  for the string 'aabbabab', Find

- a) Derivation tree
- b) Rightmost derivation
- c) Leftmost derivation.

**Q4)** Design push down automata for the language contains equal number of a's and equal number of b's over the alphabets  $\{a,b\}$

**Q5)** Explain about Universal Turing machine, counter machine and church hypothesis.

**Q6)** Define DFA.

**Q7)** What is meant by ambiguity in CFG?

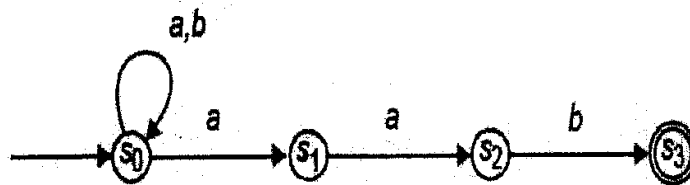
**Q8)** Define homomorphism.



(DMCS 08)

**ASSIGNMENT-2**  
**M.Sc. DEGREE EXAMINATION, MAY – 2018**  
**First Year**  
**COMPUTER SCIENCE**  
**Theory of Automata and Formal Languages**  
**MAXIMUM MARKS:30**  
**Answer ALL Questions**

**Q1)** Convert the NDA to equivalent DFA for each of the following:



**Q2)** Explain about moore and mealy machines.

**Q3)** Show that  $L = \{a^n | n \text{ is perfect square}\}$  is not regular.

**Q4)** Eliminate all the  $\epsilon$  –productions from the following CFG:

$$S \rightarrow AaB | aaB, A \rightarrow \epsilon, B \rightarrow bbA | \epsilon$$

**Q5)** Covert the following CFG into CNF grammar.

$$S \rightarrow \sim S | [S \supset S] | p | q$$

**Q6)** Describe the closure properties of CFL.

**Q7)** Design Turing machine for the language  $L = \{a^n b^n | n \geq 1\}$ .

**Q8)** Show that “Post Correspondence Problem is un-decidable”.

**Q9)** What is meant by nullable and unit productions?

**Q10)** Define context sensitive language.

**(DMCS09)**

**ASSIGNMENT-1**  
**M.Sc. DEGREE EXAMINATION, MAY – 2018**  
**First Year**  
**COMPUTER SCIENCE**  
**Computer Networks**  
**MAXIMUM MARKS:30**  
**Answer ALL Questions**

- Q1)* Explain about the internet protocol stack.
- Q2)* Explain about the Electronic Mail in the internet.
- Q3)* Explain about the Connection-Oriented Transport protocol.
- Q4)* Explain about a Link State Routing Algorithm.
- Q5)* Explain about address resolution protocol.
- Q6)* What is meant by a handshaking protocol?
- Q7)* Explain about Telnet.
- Q8)* Explain about logical communication.

**(DMCS09)**

**ASSIGNMENT-2**  
**M.Sc. DEGREE EXAMINATION, MAY – 2018**  
**First Year**  
**COMPUTER SCIENCE**  
**Computer Networks**  
**MAXIMUM MARKS:30**  
**Answer ALL Questions**

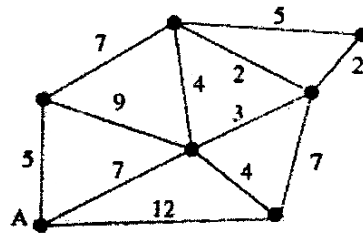
- Q1)* Explain about End Systems, Clients and Servers.
- Q2)* List the various network application user agents that you use on a daily basis.
- Q3)* Is it possible for application to enjoy reliable data transfer even when the application runs over UDP?
- Q4)* Explain about UDP.
- Q5)* Explain about IPV6 Packet Format.
- Q6)* Explain about IP Addressing.
- Q7)* Explain about data link layer services.
- Q8)* Explain about error detection methods.
- Q9)* Explain about gateway routers.
- Q10)* Explain about hub.



(DMCS10)

**ASSIGNMENT-1**  
**M.Sc. DEGREE EXAMINATION, MAY – 2018**  
**First Year**  
**COMPUTER SCIENCE**  
**Design and Analysis of Algorithms**  
**MAXIMUM MARKS:30**  
**Answer ALL Questions**

- Q1)** Discuss various asymptotic notations used to measure the running time of algorithm.
- Q2)** Divide and conquer paradigm involves three steps at each level of recursion. What are all they? Show that merge-sort algorithm closely follows these steps. Illustrate the operation of merge sort on the array  $A = \{3, 41, 52, 26, 38, 57, 9, 49\}$
- Q3)** Given weight vector  $(w_1, w_2, w_3, w_4, w_5, w_6, w_7) = (2, 3, 5, 7, 1, 4, 1)$  and profit vector  $(p_1, p_2, p_3, p_4, p_5, p_6, p_7) = (10, 5, 15, 7, 6, 18, 3)$  and Knapsack of capacity 15. Find optimal solution for 0/1 knapsack problem
- Q4)** Construct Minimum spanning tree for the following graph using prims algorithm



- Q5)** Explain travelling salesman problem. Solve using branch and bound strategy.

$$\begin{bmatrix} \infty & 7 & 3 & 12 & 8 \\ 3 & \infty & 6 & 14 & 9 \\ 5 & 8 & \infty & 6 & 18 \\ 9 & 3 & 5 & \infty & 11 \\ 18 & 14 & 9 & 8 & \infty \end{bmatrix}$$

**(DMCS10)**

**ASSIGNMENT-2**  
**M.Sc. DEGREE EXAMINATION, MAY – 2018**  
**First Year**  
**COMPUTER SCIENCE**  
**Design and Analysis of Algorithms**  
**MAXIMUM MARKS:30**  
**Answer ALL Questions**

**Q1)** Solve the following recurrence relation using master's theorem.

$$T(n) = \begin{cases} 1 & \text{if } n = 1 \\ T(n-1) + n(n-1) & \text{if } n \geq 2 \end{cases}$$

**Q2)** State and describe the connected and bi-connected components

**Q3)** Describe the activity selection problem for job sequencing.

**Q4)** Compare and contrast DFS and BFS.

**Q5)** What do you mean by dynamic programming? What is difference between dynamic programming and greedy method?

**Q6)** Describe any string matching algorithm. Also calculate its time complexity.

**Q7)** State and explain about 4 – queen's problem.

**Q8)** Find the subset from the given sum using back tracking.  
S = {1, 2, 5, 7} and d = 8

**Q9)** State quick hull problem.

**Q10)** What is Huffman tree?

**Q11)** What is the best and worst case complexities of merge sort?

**Q12)** State general method of branch and bound.

**Q13)** Define optimal BST.