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SEAT No. :

PF5634

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F.Y.M.C.A. (Management)

DSA502MJ (IT-12) : DATA STRUCTURES AND ALGORITHMS

(2024 Pattern) (Semester - I)

Time : 2½ Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) *All questions are compulsory.*
2) *From Q.1 to Q.5 having internal choices.*

Q1) a) Write an algorithm to print the smallest and largest element in an array. **[6]**

b) Explain difference between static and dynamic arrays. **[4]**

OR

c) Write an algorithm to insert an element at any specified position in an array. **[6]**

d) Justify how sparse matrix is better than normal matrix. **[4]**

Q2) a) Write an algorithm to insert a node at the end of the singly linked list and traverse the singly linked list. **[6]**

b) Difference between circular linked list and doubly linked list. **[4]**

OR

c) Write an algorithm to delete a node from doubly linked list from end and traverse the doubly linked list. **[6]**

d) Explain various applications of circular linked list. **[4]**

Q3) a) Convert the following infix expression to postfix expression using stack. **[6]**

A + (B/C – (D * E ^ F) + G) * H

b) Write an algorithm to perform push and peek of node on stack. **[4]**

OR

c) Covert the following infix expression to prefix expression using stack. **[6]**

(A+B/C+D*(E–F)^G)

d) Explain advantages of circular queue over linar queue. **[4]**

P.T.O.

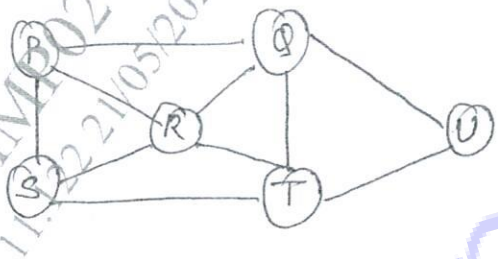
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Q4) a) Construct AVL tree for the following **[6]**
69, 83, 71, 50, 39, 76, 10, 83

b) Define Binary Tree and explain Binary Tree Representation using linked list in detail. **[4]**

OR

c) Apply DFS algorithm to traverse the following graph mention in proper steps. **[6]**



d) Difference between DFS and BFS. **[4]**

Q5) a) Apply Quick Sort Algorithm to sort the given data : 5, 4, 2, 3, 6, 10, 8, 11, 7. **[6]**

b) Explain Hash Table in detail with help of proper example. **[4]**

OR

c) Apply Binary Searching Technique for the following data and search key = 58. **[6]**
12, 14, 26, 31, 41, 42, 53, 58, 71, 88

d) Explain min heap and max heap. **[4]**

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