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SEAT No. :

PF5685

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

DSA 502 MJ : DATA STRUCTURE & ALGORITHMS

(2025 Pattern) (Semester-I)

Time : 2½ Hours] *[Max. Marks : 45*

Instructions to the candidates:

1) *All questions are compulsory.*
2) *All questions carry equal marks.*
3) *Only algorithm is expected (students are requested not to write programming code.)*

Q1) a) Write an algorithm to delete an element from given position in an array. **[5]**

b) Explain sparse matrix with an example. **[4]**

OR

c) Write an algorithm for addition of two 3 × 3 matrices. **[5]**

d) Explain memory allocation in 2-D array with an example. **[4]**

Q2) a) Write an algorithm to count total number of nodes in singly linked list. **[5]**

b) Differentiate between Singly & Doubly linked list. **[4]**

OR

c) Write an algorithm to delete an element from doubly linked list. **[5]**

d) Give diagramatic representation of doubly linked list & write any two application of doubly linked list. **[4]**

Q3) a) Convert the following infix expression into postfix expression. **[5]**

b) Explain any 4 applications of stack. **[4]**

OR

c) Write an algorithm to perform all operations on queue using linked list. **[5]**

d) Explain string reversal using stack with suitable example. **[4]**

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Q4) a) Create AVL tree using following data : **[5]**

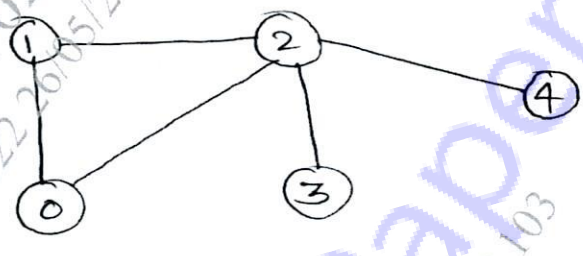
50, 40, 30, 60, 70, 20.

Show required rotations to balance the tree.

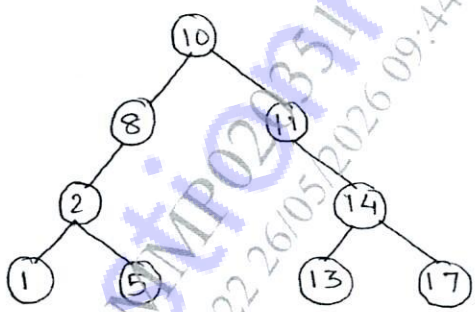
b) Differentiate BFS & DFS. **[4]**

OR

c) Write an algorithm to perform BFS on following graph & write stepwise sequence. **[5]**



d) Write preorder & postorder traversal of the following tree. **[4]**



Q5) a) Apply merge sort algorithm on the following numbers: **[5]**

44, 11, 78, 23, 3, 90, 16

b) Define hash table & explain all hash functions with suitable example. **[4]**

OR

c) Write an algorithm to search 79 in the following array using Binary search.
17, 29, 38, 52, 79, 81, 95, 102. **[5]**

d) Create max heap for the following data:

48, 72, 36, 8, 79, 22, 84, 66. **[4]**

