Total No. of Questions : 8]

SEAT No. : [ ]

PA-1244

[Total No. of Pages : 3

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S.E. (Information Technology)

DATA STRUCTURES & ALGORITHMS

(2019 Pattern) (Semester - III) (214443)

Time : 2½ Hours] ***[Max. Marks :70***

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7or Q8.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate marks.***
4) ***Assume suitable data, if necessary.***

Q1) a) Discuss how a two-way stack can be developed using array and write sudo code for Push, Pop and display operations. **[9]**

b) Write a code for doubly linked list creation, insert and Display and mention the time complexity of operations. **[9]**

OR

Q2) a) Convert the following infix expressions to postfix expressions using stack data structure. 1) A+B*C^D-E/F 2) ((A+B)*C-(D-E))^(F+G)**[9]**

b) Write a sudo code for Queue implementation using array . Perform the following operations: 1) Queue Full 2) Queue Empty 3) equeue 4) dqueue **[9]**

Q3) a) Construct a binary tree from the given traversals

Pre-order: * + a – b c /– d e – + f g h In-order : a + b – c * d – e/f + g – h **[9]**

b) What is a Binary Tree? Explain the following operations on Binary Tree i) Inserting a node in to BT ii) Deletion a node from BT **[8]**

OR

Q4) a) What is the use of threaded binary free? Give the node structure required for a threaded binary tree. Write pseudo code to find in-order successor of any node X in a threaded binary tree. **[9]**

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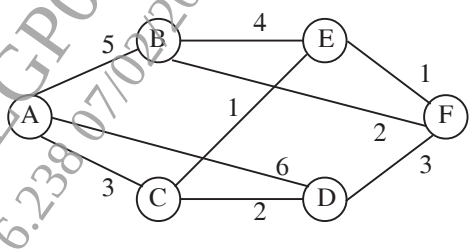
b) Write a pseudo code to implement binary search tree for performing following operations : i) Display - Mirror image ii) Display - Minimum value iii) Display average value iv) Display leaf nodes **[8]**

Q5) a) Define Minimum Spanning Tree. Compare Prim's and Kruskal's Algorithm. Construct a minimum spanning tree for the given graph using Kruskal's Algorithm. What is the cost of the MST? **[9]**



b) Given the following Adjacency matrix, construct the graph and traverse it in Breadth first order starting at vertex 'F'. **[9]**

	A	**B**	**C**	**D**	**E**	**F**
A	0	3	7	2	4	0
B	3	0	9	0	0	10
C	7	9	0	1	0	0
D	2	0	1	0	5	8
E	4	0	0	5	0	6
F	0	10	0	8	6	0

OR

Q6) a) Construct an Optimal Binary Search Tree for the following data :

N=4, Key Set = {C, E, M}, {p1, p2, p3} = {0.1, 0.2, 0.15},{q0, q1, q2, q3} = {0.15, 0.05, 0.3, 0.05}. What is the cost of the OBST? **[9]**

b) Define AVL Tree. Illustrate with example the various types of rotations that are performed to balance the binary tree. **[9]**

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Q7) a) Explain with example hash functions? **[9]**

b) Write short note on closed hashing and Open addressing. **[8]**

OR

Q8) a) Explain chaining with replacement and chaining without replacement in hashing? **[9]**

b) Write Comparison of different file organizations (sequential, index sequential and Direct Access) **[8]**

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