Paper / Subject Code: 80702 / Data Structures

Q. P. Code: 20937

21/2	hours)	
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Total	M	ar	ks:	75

N. B.: (1) All questions are compulsor	orv
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- (2) Make <u>suitable assumptions</u> wherever necessary and <u>state the assumptions</u> made.
- (3) Answers to the **same question** must be **written together**.
- (4) Numbers to the **right** indicate **marks**.
- (5) Draw <u>neat labeled diagrams</u> wherever <u>necessary</u>.
- (6) Use of **Non-programmable** calculators is **allowed**.

Q 1 Attempt *any three* of the following:

15

- a. What is an Algorithm? Explain properties of an algorithm.
- b. Write an algorithm for searching the element in an array.
- c. What is data structure? Explain primitive and non-primitive data structure.
- d. What is time and space complexity? Explain Big O and Big Theta notation.
- e. Write an algorithm for sorting the elements of an array.
- f. Write an algorithm for merging two arrays.

Q 2 Attempt <u>any three</u> of the following:

15

- a. Explain the structure of single linked list.
- b. Explain algorithmically the traversal of single linked list.
- c. Write an algorithm for reversing the single linked list.
- d. Explain the structure of double linked list.
- e. Explain in brief the working mechanism of circular linked list.
- f. Explain how polynomials are presented using linked list.

Q 3 Attempt <u>any three</u> of the following:

15

- a. What is stack? Write an algorithm for PUSH operation.
- b. Write the steps for converting infix to postfix. And Convert the following expression into postfix form: a*b+c+d/(e+f)
- c. Explain the working mechanism of Circular queue.
- d. Write an algorithm for Deque.
- e. Explain the concept of recursion with suitable example.
- f. What is Queue? Explain the operations of queue with suitable example.

Q 4 Attempt <u>any three</u> of the following:

15

- a. Write an algorithm for Bubble sort.
- b. Explain the difference between binary search and sequential search.
- c. What is heap? Explain the concept of minimum heap.
- d. Sort the following elements using Insertion sort. 22,43,12,55,67,71,5,89,47,50

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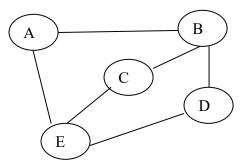
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- e. What is binary tree? Construct the binary tree for the following: 21,18,7,9,11,8,19,14,13,6
- f. Explain inorder and preorder traversal of the tree.

Q 5 Attempt <u>any three</u> of the following:

15

- a. What is Hashing? Explain Linear Probing with suitable example.
- b. What is collision? Explain how it is resolve.
- c. What is Graph? Explain directed and undirected graph.
- d. Explain in brief about spanning tree with suitable example.
- e. Give the outline of Kruskal's algorithm.
- f. What is Adjacency Matrix? Generate adjacency matrix for the following undirected graph:



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