

Roll No.

Total No. of Pages : 02

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B.Tech (CE) / B.Tech.(CSE) (Sem.-3)

DATA STRUCTURE & ALGORITHMS

Subject Code : BTCS-301-18

M.Code : 76436

Date of Examination : 14-01-23

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- a. What are the advantages of linked list?
- b. What is Big O notation?
- c. Write the routine to delete an element from queue.
- d. Convert the infix $(a + b) * (c + d) / f$ into postfix expression.
- e. What are the applications of binary tree?
- f. Define B^+ tree.
- g. What is simple path?
- h. What is an acyclic graph?
- i. What is the output of selection sort after the 3rd iteration on this 17, 4, 45, 8, 27, 13 sequences?
- j. Which sorting algorithm is best if the list is already sorted? Why?

SECTION-B

2. Write an Algorithm to traverse a graph using Depth First Search.
3. Write an algorithm to insert an element at n^{th} position in doubly linked list. Also, discuss the merits and demerits of doubly linked list.
4. What is polish notation? Explain the step-by-step procedure to evaluate the following postfix expression $623 + - 382 / + * 243 +$
5. What is max heap. Construct max heap for the following: 140, 80, 30, 20, 10, 40, 30, 60, 100, 70, 160, 50, 130, 110, 120.
6. How linked list can be used for representing polynomials? Explain using a suitable example.

SECTION-C

7. Write an algorithm for insertion sort. Compare its best-case, average-case, and worst-case time complexity with merge sort with suitable example.
8. Suppose the following list of letters is inserted in order into an empty binary search tree: J, R, D, G, T, E, M, H, P, A, F, Q. Construct the binary search tree and find the in-order, pre-order and post-order traversal of BST created.
9. What is AVL Tree? Construct a Balanced AVL Tree for the following sequence of numbers: 50, 20, 60, 10, 8, 15, 32, 46, 11, 48.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.