Roll No. | | | | | | | | | | | | |

Total No. of Questions : 18

Total No. of Pages : 02

B.Tech.(CSE) (2018 Batch) (Sem.–3)

DATA STRUCTURE & ALGORITHMS

Subject Code : BTCS-301-18

M.Code : 76436

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

Write briefly :

1. Write short note on space complexity.
2. What are the components of space occupied by a program?
3. Array and binary heap can be used to implement priority queue. Compare these methods with respect to time complexity for insertion and deletion.
4. Suggest an application of queue. Explain how queue is a better choice than array for that application.
5. Advantages of doubly linked list over singly linked list.
6. Differentiate between Binary Search Tree and AVL Tree.
7. What is a K-complete graph?
8. Differentiate between directed and undirected graph.
9. Discuss pros and cons of Adjacency list representation of a graph.
10. What is Time complexity for searching in a BST in worst case? And Why?

SECTION-B

11. Solve the below recurrence relation using substitution method.

$$T(n) = \begin{cases} T\left(\frac{n}{2}\right) + n^2 ; n > 1 \\ 1 \qquad\qquad ; n = 1 \end{cases}$$

12. Write pseudo code to implement bracket matching in an expression using stack. Consider expression can have '( )', '{ }' and '[ ]' brackets.

13. Explain with example insertion and deletion in a B+ tree.

14. Compare quick and merge sort for best, average and worst case scenarios with help of examples for each.

15. Construct MAX-HEAP for the following input by inserting elements one after another. Show heap after each iteration.

    20, 55, 16, 102, 13, 78, 94

SECTION-C

16. Convert the following infix expression to postfix. Illustrate each step clearly.

    a*(b ^ c (d/e – f) ^ g) + h

17. Write function to merge two sorted lists of length L1 and L2 respectively. Time complexity of function should not be greater than O (L1 + L2).

18. Write the algorithm for pre-order tree traversal. Also show the steps of this algorithm on an example set of numbers.

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.