

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electronics & Communication Engineering) (Sem.-4)

**DATA STRUCTURE AND ALGORITHMS**

Subject Code : BTCS/301/18

M.Code : 77567

Date of Examination: 14-05-2024

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 :**

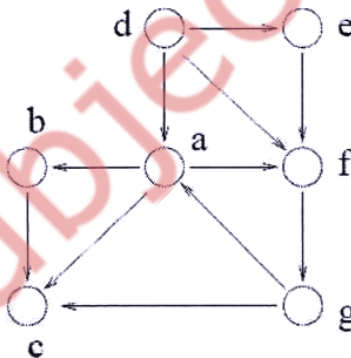
- a) What is a heap? How elements are inserted in a heap?
- b) What do you mean by time space trade off an algorithm?
- c) What is merging? Discuss with examples.
- d) What is hashing? Explain.
- e) Briefly explain various rotations on AVL tree.
- f) Discuss tree traversals.
- g) What is a stack? Write applications of a stack.
- h) Differentiate between array and link list.
- i) Define Graph. How it is represented in memory?
- j) Compare single and doubly link list.

## SECTION-B

2. Discuss representation of binary tree using arrays and linked list.
3. Write algorithm for Insertion sort. Apply the same on the following elements to arrange in decreasing order.  
13    34    23    9    44    18    15
4. Describe the different notations used to describe the asymptotic running time of an algorithm.
5. Explain the binary search algorithm using a suitable example. How binary search differs from linear search?
6. What do you mean by circular queue? How insertion and deletion are performed on circular queue? Discuss with examples.

## SECTION-C

7. Write DFS graph traversal algorithm and apply on the following graph.



8. Write an algorithm to insert a new node in the existing sorted single linked list. Discuss your algorithm with the help of a suitable example.
9. What are B-trees? Write their properties. Design a B-tree of order 5 from the following nodes.  
9, 15, 14, 10, 19, 12, 16, 21, 18, 13, 27, 17, 26, 32, 11, 20, 22, 28, 29, 24.

**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.**