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 : 24-11-2023

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. **Answer briefly :**

    a) What is a stack? Write applications of stack.

    b) Differentiate between array and link list.

    c) What are linear and non-linear data structures?

    d) Discuss tree traversals.

    e) Write down applications of binary trees.

    f) What is a complete binary tree? Where it is used?

    g) Differentiate between linear and binary search.

    h) What are priority queues? What is their use?

    i) Write advantages and disadvantages of doubly linked list over singly linked list.

    j) Differentiate between BFS and DFS.

SECTION-B

2. What do you mean by Queue? Explain various operations of Queue with example.

3. Write an algorithm for Insertion sort and discuss the same with the help of an example.

4. Define binary tree. Explain the memory representation of binary tree.

5. Write algorithm for binary search and discuss with suitable example.

6. What do you mean by doubly linked list? How you can insert and delete an element from a doubly linked list.

SECTION- C

7. a) Discuss the use of Big O notation and time space trade off for an algorithm.

   b) What is hashing. Discuss various methods of collision handling with example.

8. Write an algorithm to delete a given node from a one-way link list. Explain with example.

9. Write algorithm to convert given infix expression to postfix expression. Use your algorithm to convert following infix expression to postfix.

$$p + (u * z - (a / b \uparrow q) * m) * y$$

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.