B.Tech.(IT) (2018 Batch) (Sem.–3)
# DATA STRUCTURE & ALGORITHMS
Subject Code : BTIT-301-18
M.Code : 76391
Date of Examination : 14-01-2023

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. Write briefly :

   a) How do you test for an empty queue?

   b) What do you mean by the depth of a binary tree? What is the depth of a complete binary tree.

   c) Which data structure is used to perform recursion and why?

   d) Write different ways of traversing a tree.

   e) How are strings stored in memory?

   f) What are priority queues?

   g) What is time space trade off?

   h) What is adjacency matrix?

   i) What is polish station?

   j) Compare the time complexities of bubble sort and merge sort.

2. Explain the addition and deletion operation performed on a circular queue with necessary algorithm.

3. Construct the binary tree given the following traversals .

   Pre-order : E A C K F H D B G

   In-order : F A E K C D H G B

4. Write an algorithm to insert a node into a linked list before a given node.

5. What is single source shortest path? Discuss Dijkstra's single source shortest path algorithm with an example.

6. Explain various hashing functions. What do you mean be collisions in hashing?

SECTION-C

7. Give an algorithm for constructing a BST. While, constructing the tree, take care duplicate values are not added. Trace algorithm for: S,T,P,Q,M,N,0,R,K,V,A,B.

8. a) How 2-d arrays are represented in memory? Explain in detail.

   b) Write a program to multiply two-dimensional arrays.

9. Write down quicksort Algorithm and illustrate its working to sort list:

   25, 15, 30, 9, 99, 20, 26, 80, 42

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.