DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE – RAIGAD -402 103
Semester Examination – May - 2019

Branch: B. Tech in Information Technology   **Sem.:- IV**
Subject: - Data Structures and applications   **Marks: 60**
Subject Code: - BTITC402
Date:- 16/05/2019   **Time:- 3 Hr.**

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Instructions to the Students

    1. Each question carries 12 marks.

    2. Attempt **any five** questions of the following.

    3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.

    4. If some part or parameter is noticed to be missing, you may appropriately
       assume it and should mention it clearly

Q.1. a) Explain various types of data structures.   6 marks

    i) Primitive and non-primitive data structures

    ii) Linear and non-linear data structures

  b) What is Recursion? List out and explain the types of recursion. Write an algorithm of finding

    solutions for factorial of n numbers.   6 marks

Q2. a) Explain stack data structure. Write an algorithm of PUSH and POP operations of stack.   6 marks

  b) Write an algorithm for conversion of infix expression to prefix expression and convert the

   expression **P= (A+B)*(C/D)** into prefix expression.   6 marks

OR

  a) Define Circular Queue. Write an algorithm for insertion and deletion of element in Circular Queue
using array.   6 marks

  b) What is Queue? List out the types of queue. Write an algorithm for insertion(enqueue) and

    deletion(dequeue) of element in simple queue using array.   6 marks

Q3. a) What is Linked list? Explain types of linked list with diagram.   6 marks

  b) Write the algorithm to insert an element at the beginning and at the end (last) of singly linked list.

    List out the advantages and disadvantages of singly linked list.   6 marks
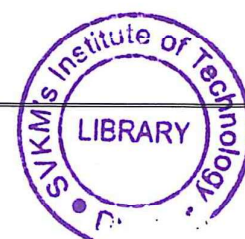
Q4. a) What is Binary tree? Write the Recursive traversal algorithm of binary tree: 6 marks

    a. Pre_order Traversal

    b. In_order Traversal

    c. Post_order Traversal

  b) Explain Array and Linked list representation of binary tree.   6 marks

<div align="center">OR</div>

a) Explain Strictly binary tree and complete binary tree with example.   6 marks

  b) Suppose the following list of numbers is inserted in order into an empty binary search tree:

    100, 50, 115, 45, 55, 105, 120

    a. Draw a binary Search tree (T).

    b. Find preorder, inorder, and postorder traversals of T

Q5. a) What is graph? Explain matrix and linked list representation of graph.   6 marks

  b) Define and explain the following terms with an example   6 marks

    a. Weighted graph

    b. Directed graph and undirected graph

    c. Degree of vertex(Indegree and Outdegree of a vertex)

Q6. a) Explain binary search? Suppose that the following numbers are present in a list 9, **12, 24, 30, 36, 45, 70.** Search 45 from the list using binary search technique.   6 marks

  b) What is selection sort? Write an algorithm of selection sort. Sort out the following elements **40, 30, 50, 20, 10** using selection sort.   6 marks

<div align="center">END</div>