PVP 20

Code: 20ES1305

II B.Tech - I Semester – Regular Examinations - FEBRUARY 2022

DATA STRUCTURES

(Common for CSE, IT)

Duration: 3 hours Max. Marks: 70

Note: 1. This paper contains questions from 5 units of Syllabus. Each unit carries 14 marks and have an internal choice of Questions.
2. All parts of Question must be answered in one place.

UNIT – I

1. a) Explain Binary Search algorithm and compare with the linear search algorithm. 7 M

   b) Develop an algorithm to merge two sorted arrays into a single sorted array and trace it with an example. 7 M

OR

2. a) Develop a program to sort a set of strings in alphabetical order using Bubble sort algorithm. 7 M

   b) What do you mean by space complexity and time complexity of an algorithm? Define recursive function. What are the essential conditions to be satisfied by a recursive function? 7 M

UNIT – II

3. a) Explain the insertion and deletion operations in a sorted single linked list with source code and suitable node diagrams. 7 M

   b) Develop an algorithm/pseudocode to count the number 7 M

of nodes in a Singly Linked List and discuss the applications of Linked list.

OR

4. a) Make use of search function to find the name and cgpa of a student based on the roll number in a single linked list which contains student details such as roll number, name and cgpa. 7 M

   b) Write algorithms to perform the following operations on a doubly linked list. 7 M

   (i) Insert a node with data 'y' after a node whose data is 'x'.

   (ii) Delete a node whose data is 's'.

   (iii) Insert a node with data 'a' as the 1st node of the list.

UNIT-III

5. a) What is a Stack? How to represent a stack using array? Give suitable example. 7 M

   b) Write algorithms for insertion and deletion operations in a queue implemented using linked list. 7 M

OR

6. a) Develop an algorithm to evaluate postfix expression. Trace the algorithm on the following input: 7 M

   623+-84/+23^+ (all numbers are single digits)

   b) The seven elements A, B, C, D, E, F and G are pushed onto a stack in reverse order, i.e., starting from G. The stack is popped five times and each element is inserted into a queue. Two elements are deleted from the queue and pushed back onto the stack. Now, one element is popped from the stack. What is that element? Explain 7 M

the total process with diagrams and finally write top, front, rear values.

UNIT – IV

7. a) Write a non-recursive algorithm for Post-order traversal of a binary tree . 4 M

   b) Create a Binary search tree for the data: 50, 80, 30, 40, 90, 60, 20, 70, 55, 65, 75, and 35. Write Pre-order, In-order, and Post-order traversals. Now delete the nodes 75, 80 and 50 in that order and write all the traversals again. 10 M

OR

8. a) Write an algorithm that performs deletion operation in Binary Search Tree. 7 M

   b) Define Binary Tree. Explain the properties and memory representation of a Binary tree. 7 M

UNIT – V

9. a) Develop an algorithm for Breadth First Search. Demonstrate BFS using suitable example. 7 M

   b) What is a graph ADT? Explain the different ways of representing the graphs in the memory . 7 M

OR

10. a) What is a Minimum Spanning tree and explain Prim's algorithm with an example. 7 M

    b) Explain in detail about graphs. 7 M