[This question paper contains 8 printed pages.]

Your Roll No.....

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Sr. No. of Question Paper : 1431

Unique Paper Code : 2342571201

Name of the Paper : Data Structure

Name of the Course : B.A. (Programme)

Semester : II

Duration : 3 Hours Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. **Section A** is compulsory.
3. Answer any **four** questions from **Section B**.
4. **All** parts of Question must be attempted together.

P.T.O.

SECTION A

1. (a) Explain Static and Dynamic data structure with the help of a suitable example. (4)

(b) Write C++ code for basic operations on Stack using array. (4)

(c) Differentiate between Binary tree and Binary heap. (4)

(d) Mention advantages of using Tree data structure. (3)

(f) What are Height-balanced trees? Explain with the help of a suitable example. (3)

(g) Mention any three applications of Stack. (3)

(h) Apply insertion sort on given array arr = {12, 4, 34, 6, 8}. Mention the resultant array after the 2nd iteration. (3)

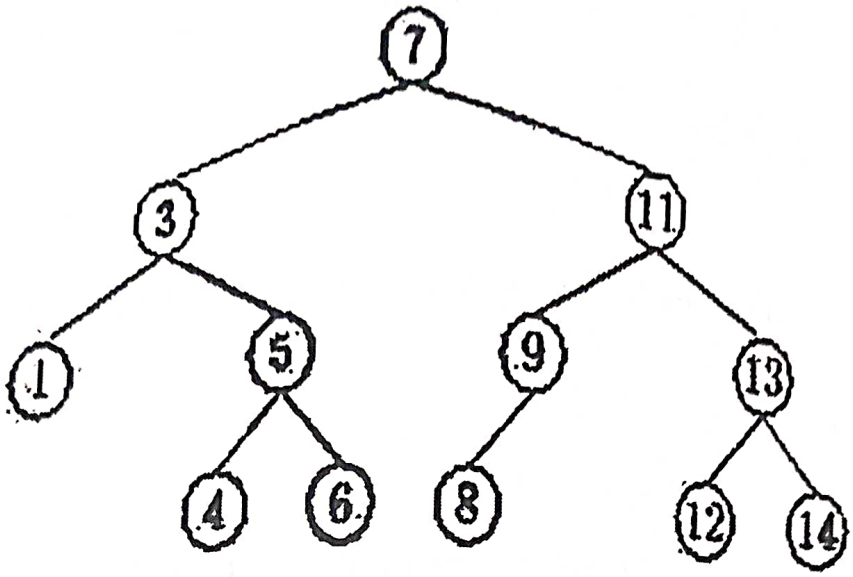
(i) Differentiate between Queue and Priority Queue. (3)

(j) What will be the output after performing following operations on an empty stack

Push(4), Push(5), Pop(), pop()Push(5), Push(6), Pop() pop() (3)

SECTION B

2. Consider the following Binary Search Tree (BST). (15)



Show the status of BST after each of the following operations :–

(i) Draw updated tree after inserting a node with value 2 in the BST.

(ii) Delete node 11 from the updated BST.

(iii) Write post-order traversal of the resultant BST.

(iv) Add a node with value 10 to the tree constructed in step (iii) and draw the final tree.

(v) Write BFS traversal of the Final tree.

3. (a) Differentiate between Array and Linked list with suitable example. (6)

(b) Draw a binary tree whose in-order and preorder traversals are given below :–

In-order : FBADCE

Preorder : ABFCDE (5)

(c) Write a program in C++ to perform insertion and deletion at the end of a singly linked list. (4)

4. (a) Differentiate between Deque and Queue with the help of a suitable example. (6)

(b) Explain Master's theorem for solving recurrences with the help of a suitable example. (5)

(c) Explain Stack overflow and Stack underflow condition. (4)

5. (a) Write a program in C++ to implement Queue using Array. (6)

(b) List any two advantage and two disadvantage of using recursion (5)

(c) Write a C++ program to find n Factorial using recursive function. (4)

6. (a) Differentiate between (with example) : (6)

(i) BSF and DFS Traversal

(ii) BST and height-balanced tree

(b) Write C++ code to implement doubly linked list and discuss basic operations to be performed on doubly linked list. (5)

(c) Explain base case and recursive case in recursion with a suitable example. (4)

7. (a) Illustrate and perform count sort on the array {4,7,2,0,7,5} (6)

(b) How many iterations are required to sort an array {6,12,5,8,4,7} using insertion sort? (5)

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(c) Explain Big - analysis with an example. (4)