53 (CS 304) DTST

2014

DATA STRUCTURES

Paper : CS 304

Full Marks : 100

Pass Marks : 30

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. *(a)* Explain a linear linked list using array implementation. 6

   (b) Describe a two-dimensional array. 4

   (c) What is a queue ? Write an algorithm /c-statement to insert into and delete from a queue a particular data item. 3+7=10

2. *(a)* Write an algorithm /c-statement of Selection Sort. 10

(b) Sort the following list of numbers using Bubble Sort : 10

25, 57, 48, 37, 12, 92, 86, 33

3. (a) Write an algorithm / c-statement for Binary Search technique. 10

(b) Differentiate the performances of Selection Search and Binary Search techniques. Which one is better and why ? 10

4. (a) What is a Binary Search Tree (BST). Consider the following BST : 3+7=10

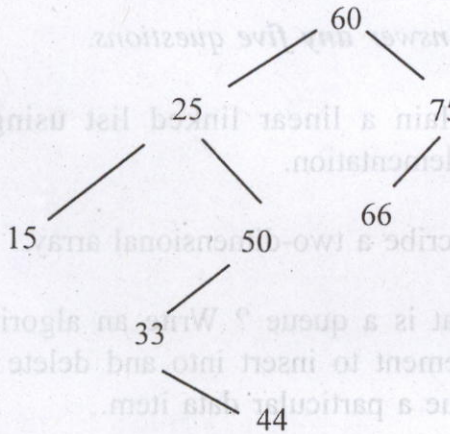

Fig. 1

Draw the BST after deleting the nodes 33 and then 25.

(b) Define the terms of a binary tree : 2×5=10

(i) height

(ii) level

(iii) order

(iv) leaf nodes

(v) root node

5. (a) A binary tree T has 9 nodes. The inorder and preorder traversals of T are : 12

Inorder : *E A C K F H D B G*

Preorder : *P A E K C D H G B*

Draw the tree.

(b) Why is an AVL tree better than a BST ? 8

6. (a) Describe various rotations of AVL tree. 12

(b) Write pseudoçodes / algorithm to perform the following : 4+4=8

(i) To append an element to the end of a linked list.

(ii) To delete the first node from the list.

7. *(a)* Write algorithm / c-statements for PUSH and POP operation of a stack. 6+6=12

(b) Discuss breadth-first traversal and depth-first traversal of a graph. 4+4=8
