Total No. of Questions : 10] [Total No. of Printed Pages : 3

Roll No. .....

CS/IT–305(N)

B. E. (Third Semester) EXAMINATION, Dec., 2010

(New Scheme)

(Common for CS & IT Engg. Course)

DATA STRUCTURES

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : Attempt any *five* questions. All questions carry equal marks.

Unit–I

1. (a) What are Asymptotic notations ? Explain each notation with example and diagram. 12

   (b) Solve the following recurrence relation $T(n) = T(n-1) + 1$, with $T(0) = 0$ as initial condition. Also find big oh notation. 8

Or

2. (a) What is recursion ? How does it differ from iteration ? Write an algorithm to generate first ten Fibonacci numbers recursively. 12

   (b) Consider a 2D array declared in "C" A [20] [30]. Element type is integer. If the base address is 1076, what will be the address of A [17] [29] ? Memory is byte oriented. 8

P. T. O.

Unit – II

3. (a) Explain the inserting and deleting node from linked list implementing stack and queue. 16

   (b) What are D-queue and priority queue ? 4

Or

4. (a) Write an algorithm to convert infix to postfix expression. Explain with example. 10

   (b) Write function for : 10

   (i) Finding size

   (ii) Checking empty

   (iii) Checking full

   for the implementation of a queue in circular array with index values to indicate emptiness.

Unit – III

5. (a) Following nodes are insert into empty tree in order : 12

   5, 16, 22, 45, 2, 10, 18, 30, 50, 12, 1

   Construct :

   (i) Binary Search Tree

   (ii) AVL Tree

   (b) Draw the order-5 B-tree resulting from inserting the following keys (in this order) into an initially empty tree : 8

   4, 40, 23, 50, 11, 34, 62, 78, 66, 22, 90, 59, 25, 72, 64, 77, 39, 12

Or

6. (a) Explain the operation of AVL Tree. 8

   (b) Write an algorithm to delete operation in any binary search tree (Taking all cases). 12

Unit – IV

7. (a) Compare the worst case performance of heap sort with the worst case performance and average case of quick sort. 10

(b) Explain insertion sort and selection sort briefly. 10

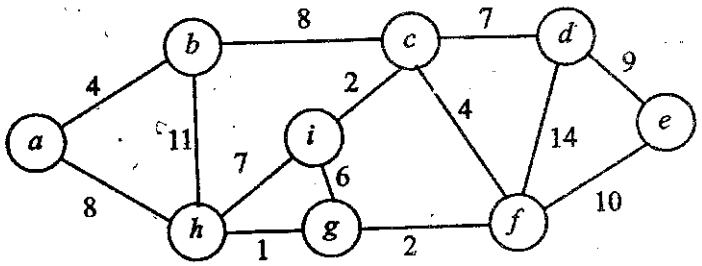
Or

8. (a) What is the difference between an index function and a hash function ? Explain three techniques to built the hash function. 10

(b) Explain how balance is restored when an insertion into height-balanced tree puts a code out of balance ? 10

Unit – V

9. (a) Apply Prim's algorithm to find the minimum spanning tree of the given graph. 12



Display the tree at each stage.

(b) Compare graph traversal techniques. 8

Or

10. (a) Explain Dijkstra algorithm with suitable example. 10

(b) Write short notes on the following : 5 each

(i) Strongly connected graph

(ii) Sparse matrix