

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 the 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

[3]

Unit – IV

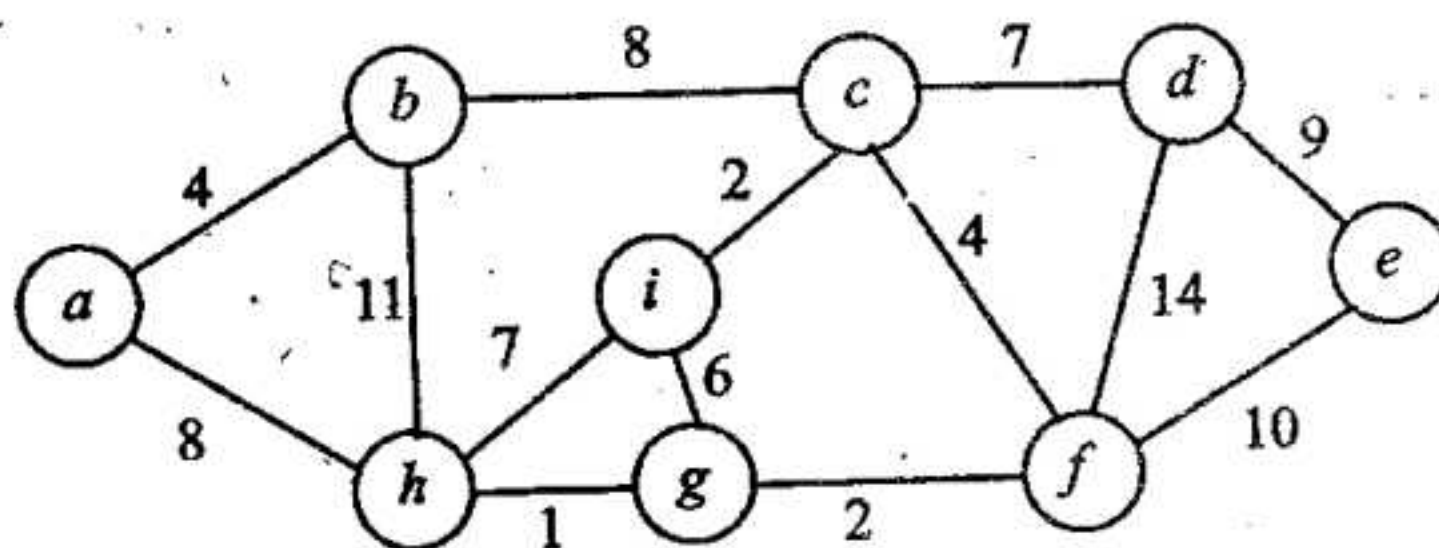
- (a) Compare the worst case performance of heap sort with the worst case performance and average case of quick sort. 10
- (b) Explain insertion sort and selection sort briefly. 10

Or

3. (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