Printed Pages : 2 **Roll No.** | | | | | | | | | | | **EEC012**

B.TECH.

THEORY EXAMINATION (SEM–) 2016-17

DATA STRUCTURE

Time : 3 Hours ***Max. Marks : 100***

Note : *Be precise in your answer. In case of numerical problem assume data wherever not provided.*

SECTION – A

1. Explain the following: **10 x 2 = 20**

(a) Differentiate between dynamic and static data structure.

(b) Explain big omega notation.

(c) Write down pop algorithm.

(d) Define simulation recursion.

(e) Write preorder traversal algorithm for a tree.

(f) Define node and hight of a tree.

(g) Define minimum spanning tree.

(h) Explain fully connected graph.

(i) 3,5,4,6,8,2,9 sort it using merge sort.

(j) Write down two differences between sequential sort and binary sort.

SECTION – B

2. Attempt any five of the following questions: **5 x 10 = 50**

(a) Define row major and column major form with example. Consider a two dimensional array X whose subscript limits are $0 \le i \le 20$, $0 \le j \le 30$ Assume that storage for the array begins at 2000 in memory and 4 bytes are required to hold each element of array. Compute the actual address of the element X [6, 10] assuming that array is stored in row major order.

(b) Define linked list and its types. Write algorithms to insert an item at end, start and specified location in singly circular linked list.

(c) Write down an algorithm for insertion in queue. Convert the following expression in prefix and postfix :

$(4 + B \uparrow C$) * D + E^ 5

(d) Explain binary tree. The order of nodes in a binary tree in order and post order traversal are as follows:

(i) Inorder: B,I,D,A,C,G,E,H,F.

(ii) Postorder:I,D,B,G,C,H,F,E,A.

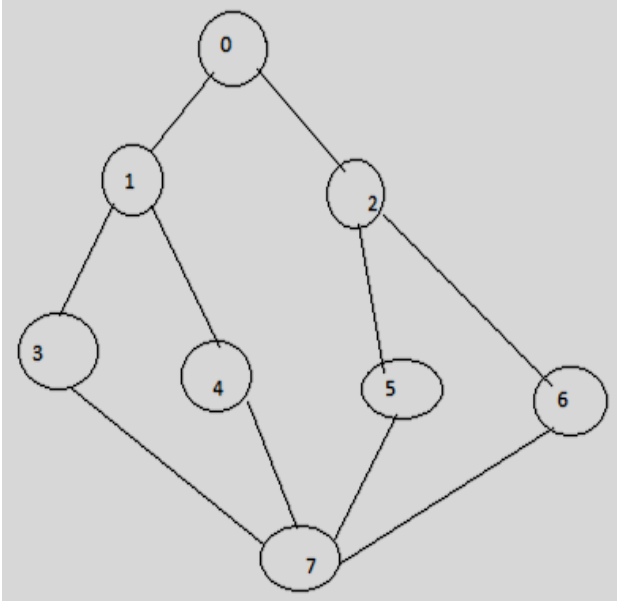
(iii) Draw the corresponding binary tree.

(e) Write Huffman algorithm. Suppose characters a, b, c, d, e, f have probabilities 0.07, 0.09, 0.12, 0.22, 0.23, 0.27 respectively. Find an optional Huffman code and draw the Huffman tree. What is the average code length?

(f) Write quick sort algorithm. Calculate best case and worst case complexity for it and sort following key values: 60,43, 53, 26, 38, 48, 50.

(g) Define AVL trees. Construct an AVL tree by inserting the following elements in order of their occurrence. 64,1,44,26,13,110,98,85.

(h) Write an algorithm for BFS traversal. Draw the BFS spanning tree of the following graph.



SECTION – C

Attempt any two of the following questions: **2 x 15 = 30**

3 Define data structure and its types. Write a C program to take transpose of a matrix.

4 Explain the problem of tower of henoi. Convert the following expression form infix to postfix and then evaluate postfix solve both the problem using stack:

(5+6)*7+8/(4+2*2) +20

5 Write prims algorithm. Find the minimum spanning tree using prims algorithm for the graph given below: