(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 131405 Roll No. | | | | | | | | | | |

B.TECH.

Theory Examination (Semester-IV) 2015-16

DATA STRUCTURE

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

Section-A

Q1. Attempt all parts. All parts carry equal marks. Write answer of each part in short. (2×10=20)

(a) What is an abstract data type? Is time and space complexity considered in defining ADT?

(b) Perform evaluation of postfix expression using stack: *ABC + *DE /–* , where

A=5, B=6, C=2, D=12, E=4

$$\begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 9 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 5 & 0 & 0 & 0 \end{bmatrix}$$

(f) Generate a binary search tree for the list - 53, 65, 86, 78, 5, 25, 34, 29

(g) How will be the elements having same priority accessed from a priority queue?

(h) How many pointers are contained as data members in the nodes of a circular doubly linked list of integers with five nodes?

(i) Draw a directed weighted (assume random weights) graph having 5 vertices and each node having drgree 4.

Q2. Attempt any five questions from this section. **(10×5= 50)**

(a) Explain asymptotic notations. Discuss Big(O) notation.

(b) Explain how polynomial can be expressed using linked list. Write a C program to add two polynomials using linked list.

(c) Write a C program to implement stack using linked list and perform PUSH and POP operations onto the stack.

(d) Explain the concept of circular queue. Discuss the base cases to be verified for carrying our insertion and deletion operations in a circular queue.

(f) What is tail recursion? Write a C program using recursive function that solves tower of Hanoi problem.

(g) Draw Huffman tree and generate Huffman code for the following symbols whose frequency of occurance in a message is stated along with symbols given below : Also estimate the total number of memory bits saved using the Huffman coding scheme.

A:15 B:16 C:17 D:12 E:25 F:4 G:6 H:1 I:15

(h) (a) Write a C program to search an element in array using binary search technique.

(15×2=30)

Q3. (a) What is the importance of Garbage Collection?

(b) Write an algorithm to delete and insert elements in DEQUE.

(c) Write an algorithm to delete last element from a doubly linked list.

Q4. (a) Sort 20, 35, 40, 100, 3, 10, 15 using selection sort.

(b) Explain with an example to find minimum cost spanning tree using Kruskal algorighm.

Q5. (a) Generate a binary tree for the following traversal sequences given -

IN-ORDER : B F G H P R S T W Y Z

PRE-ORDER : P F B H G S R Y T W Z

(b) Write an algorithm to convert an infix expression into postfix form.