Registration No. : | | | | | | | | | | |

Total number of printed pages – 3

B. Tech
BE 2106 (N)

Second Semester Examination – 2011

DATA STRUCTURE USING 'C'

Full Marks – 70

Time : 3 Hours

*Answer Question No. **1** which is compulsory and any **five** from the rest.*
The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2×10

(a) What is a stack ? Discuss the POP operation of any stack.

(b) Convert the following infix expression into its equivalent postfix and prefix expressions :

a++ –b++ + – – c / d + e * f

(c) Write at least two disadvantages of linear queues.

(d) How are collisions handled in linear probing ? Discuss with a simple example.

(e) For a list L = { 8,99,3,4,6,10 } find the output list at the end of pass 1 using bubble sorting method.

(f) What is the use of a head node in a linked list ?

(g) Show that the maximum number of nodes in a binary tree of height h is $2^h - 1$ for h >= 1.

(h) Prove with an example that a tree T with n vertices has n – 1 edges.

(i) There are 8, 15, 13, 14 nodes were there in 4 different trees. Which of them could have formed a full binary tree ? Explain in two sentences.

(j) Distinguish between digraphs and undirected graphs.

2. (a) Suppose a two dimensional matrix is represented using a row major order in C programming. Write the formula and calculate the address of element

A [10] [10]. Assume the dimension of the matrix is 10x10 and of floating type. 5

(b) What is a circular queue ? Why is it better than a normal queue ? Give some practical Examples of usage of circular queue. 5

3. (a) Write an algorithm and program in C to create 5 nodes of a linked list. 5

(b) How are priority queues implemented using a single queue ? Discuss with example. 5

4. (a) Write an algorithm to find the largest node in a Binary Search Tree. 5

(b) Create a binary search tree using the following data entered as a sequential set : 5

3 79 67 58 38 29 15 11 5

5. (a) Sort the following elements using Heap sorting method : 5

42 23 92 16 11 45 40 64 29 18

(b) Create an AVL tree using following data and show the balance factor in the resulting tree : 5

14 23 7 10 33 56 80 75 90

6. (a) Given the following inorder and preorder traversals of a binary tree. Construct the binary tree : 5

Inoder traversal : B F G H P R S T W Y Z

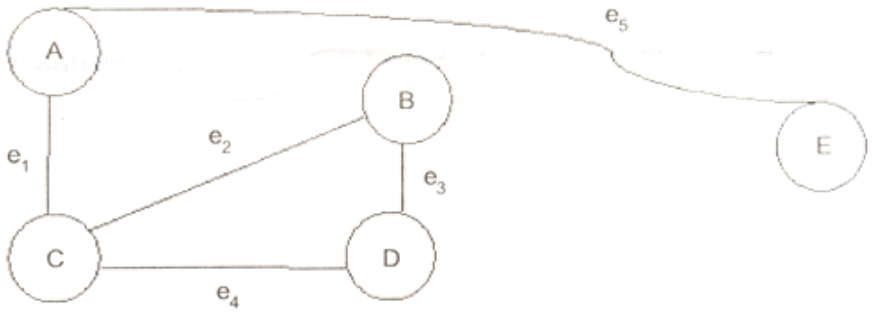
Preorder traversal : P F B H G S R Y T W Z

(b) Define a graph.Represent the graph shown using 5

(i) Adjacency matrix

(ii) Adjacency list

(iii) Incidence matrix



7. (a) What is Dynamic Memory Management ? Explain the Buddy system method of memory management with its advantages and disadvantages. 5

(b) Draw a hash table with open addressing and a size of 9. Use the hash function "k%9". Insert the keys : 5, 29, 20, 0, 27 and 18 into your table (in that order). 5

8. (a) An array contains the elements shown below :

44 78 22 7 98 56 34 2 38 35 45

Using the Quick sort arrange the elements of the array.

(b) An array contains the elements shown below. Using binary search algorithm trace the steps followed to find 20 : 5

18 13 17 26 44 56 88 97