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Your Roll No.....

658

B.Sc. (Physical Sciences/Life Sciences) (Sem. II) A

CHEMISTRY—Paper CSPT-202

(Data Structures)

(Admissions of 2010 and Onwards)

Time : 3 Hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt all questions.

Parts of a question must be answered together.

- I. (a) Convert the following infix expression to prefix : 3

$$((A + B)/(C - D) + E)*F$$

- (b) Evaluate the following postfix expression using a stack, showing the contents of stack at each step : 5

$$7 3 + 6 - 2 5 + * 2 /$$

- (c) How is a stack used to implement function calls in a computer ? 2

P.T.O.

- (d) Write a function to compute factorial of a number using : 5
- (i) Recursive approach
 - (ii) Iterative approach.

What are the advantages of each approach ?

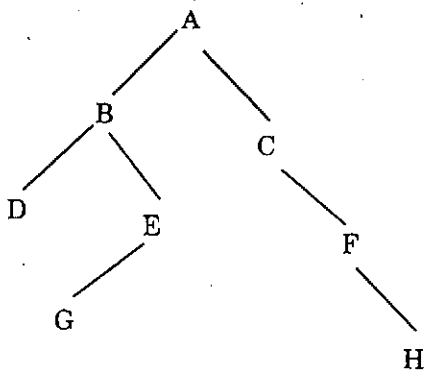
2. (a) Define a deque. List the advantages of a deque. 3
- (b) Give a data structure declaration of a priority queue. Write a function to delete an element from a priority queue. 5
- (c) Create a class in C++ to implement a linked queue of integers. The class should have inline functions for various queue operations. 7
3. (a) Write a function in C++ to concatenate two singly linked lists. 5
- (b) What is an abstract data type ? Write declaration of a stack as an abstract data type. 4
- (c) Define the following terms in the context of a binary tree : 3
- (i) Leaf node
 - (ii) Complete binary tree
 - (iii) Sibling nodes.

- (d) Write a C++ program to implement bubble sort in a list of integers. 3

4. (a) Create a binary search tree from the following sequence of input keys : 5

6, 2, 35, 89, 120, 5, 38, 7, 62, 19, 4

- (b) Give the post order, preorder and inorder traversals of the following binary tree : 6



- (c) Give appropriate C++ declaration of a doubly circular linked list. Show how the list will appear when only one node is in the list, using a diagram. 4

5. (a) Consider the following list of integers : 6

3, 11, 67, 9, 2, 15, 6, 21, 45, 13

Sort the above list in ascending order showing your steps using :

(i) Insertion sort;

(ii) Selection sort.

- (b) Write a function in C++ for insertion sort. 5

- (c) State the run-time complexity of the following algorithms, including best case and worst case : 4

(i) Binary search;

(ii) Bubble sort.