Roll No. .....

Total No. of Questions : **10**] [Total No. of Printed Pages : **4**

(1049)

B.C.A. (CBCS) RUSA IInd Semester Examination

4388

DATA STRUCTURES

Paper : BCA-0204

Time : 3 Hours] **[Maximum Marks : 70**

Note :– Part–A is compulsory. Candidates need to attempt *one* question each from Parts B, C, D and E.

Part–A

(Compulsory Question)

1. Answer the following objective type questions :

   (a) The ..... of an algorithm is the amount of time the computer requires to execute the algorithm.

   (b) Best case complexity of the bubble sort algorithm is ..... .

   (c) ..... is called a FIFO data structure.

(d) ..... is a data structure where data can be represented as a chain of nodes.

(e) A tree can be drawn if it is in preorder and ..... traversal is given.

(f) The running time for traversing all the nodes of binary search tree with n nodes and printing them in order is ..... .

Choose the correct option from the following multiple choice questions :

(g) Height of binary search tree of the given sequence 40, 30, 42, 5, 7, 23, 9, 19, is (empty tree is of height 0) :

(a) 4 (b) 5

(c) 6 (d) None of these

(h) Which of the following data structure is used in recursion ?

(a) Array (b) Stack

(c) Linked list (d) None of these

(i) The value of the postfix expression 5 2 2 +* 30 6 / – is :

(a) 36 (b) 16

(c) 15 (d) None of these

(j) A full binary tree with n leaves contains :

(a) n nodes (b) $\log_2 n$ nodes

(c) $2n - 1$ nodes (d) 2^n nodes

2. Answer the following questions in brief :

(a) Describe the stack data structure using an example.

(b) Briefly explain the difference between a tree and a binary tree.

(c) What do you mean by the time complexity and the space complexity of an algorithm ?

(d) Convert the following infix expression to postfix expression :

A* (B + C) / E – F* (G + H/K)

(e) Construct a binary tree from the given preorder traversal :

Pre-order : * – + E A B + C D 5×4=20

Part–B 10 each

3. What do you mean by time and space complexity ? Explain.

Or

4. Write an algorithm for the subtraction two matrices of dimension $r \times c$, where r and c represent the number of rows and columns, respectively.

Part–C 10 each

5. Write an algorithm/function to count the number of nodes in a singular linked list.

Or

6. Explain the advantages and disadvantages of a doubly linked list over a singular linked list.

Part–D 10 each

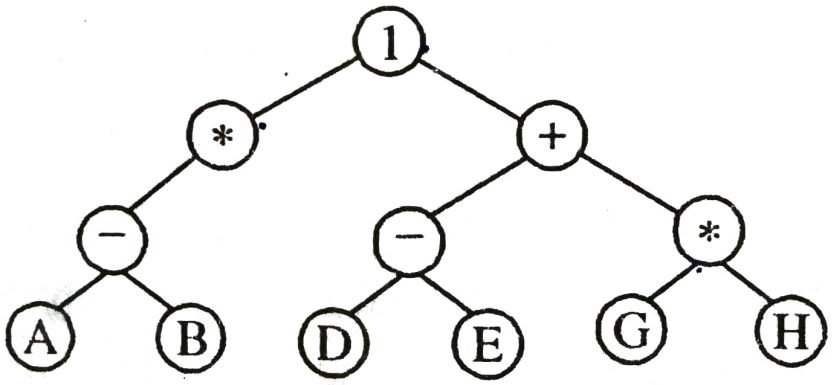
7. Give a brief description of operations that can be performed on a stack.

Or

8. What is a circular queue ? Write an algorithm/ function for deleting an element from circular queue.

Part–E 10 each

9. Traverse the tree as given below in preorder, inorder and postorder and list the vertices in the order they would be visited in each traversal scheme :



Or

10. Apply quick sort algorithm for the following list of elements by showing all the steps :

15, 10, 5, 4, 25, 30, 13.