BCA (H) 2nd Semester Examination 2022

Subject: Computer Application

Paper Name: Data Structure with C Language

Paper Code: BCA – 202

Time: 4 Hours **Full Marks: 80**

Answer Question No. 1 and any four from rest.

1. Answer any eight questions `8X2=16
   a) What do you mean by abstract data type.
   b) Define strictly binary tree.
   c) Define scope of a variable.
   d) What is the advantage of using macros in C language?
   e) What do you mean by time complexity?
   f) Write down the difference between malloc and calloc.
   g) What do mean by primitive data type?
   h) What are the basic operations of a stack?
   i) What is a directed graph?
   j) What do mean by user define function?
   k) What is a circular list?
   l) Define pointer in the context of C language.
2. Write down the algorithm of Bubble sort. Discuss about the time and space complexity of Bubble sort algorithm. Prove that the worst case time complexity of bubble sort is $O(n^2)$.
   6 + 4+ 6 = 16
3. What are the differences between a binary tree and a binary search tree? What are the differences between stack and queue? What are the advantages of circular queue over normal queue? Discuss about the time complexity of selection sort algorithm. 2+3+3+8=16
4. a)You have two lists given below through which you have to draw a binary tree.
   preorder : ENCRIPT
   inorder : RINETPC
   b) Draw a binary tree from the expression given below. Hence prove that post order tree traversal is same as postfix expression of the expression.
   A+X*(B+C-D)/E/(F-G).
   Write and discuss binary search algorithm with an example. 4+5+7 = 16

5. a) Convert the following infix notation into postfix showing the stack status after every operations:
   A+(B*C-(D+E)*G)/F
   b) Implement stack operations using linked list. 8+8 =16

6. Discuss the features of singly linked list as a storage structure.
   Write a function to delete a given node from any position to a doubly linked list. Write a program to implement a stack. 4+6+6-=16

7. Write short note (any two): 8+8 = 16
   i) Merge sort
   ii) BST
   iii) Circular linked list
   iv) Graph