Total No. of Questions : 9] *[Total No. of Printed Page : 4]*

BCA -302 (N)

Bachelor of Computer Applications

(Third Semester)

EXAMINATION, MARCH - 2021

(New Course)

Paper Second

DATA STRUCTURE USING C AND C++

Time : Three Hours] ***[Maximum Marks : 75***

Note : Attempt questions from all sections as directed.

Inst. : The candidates are required to answer only in serial order. If there are many parts of a question, answer them in continuation.

Section -A
(Short Answer Type Questions)

Note : **All** questions are compulsory. Each question carries **3** marks.

1 (a) Write two applications of Linked Lists.

(b) What is a sparse Matrix ?

(c) Explain complete Binary tree and Extended Binary tree.

(d) How the following polynomial can be represented using linked list ? Show

$$8x^3y^3 + 6x^2y - 4xy^2 + 2xy - 2$$

(e) Evaluate the following postfix expression

5,7,9, *, +, 4,9,3,1,*

(f) Differentiate between a max-heap and min-heap.

(g) What is recursion and explain with example.

(h) What is a tree ? Write the difference between tree and binary tree. Find the height of binary tree.

(i) How does the quick sort work ? Explain.

Section -B

Note : *Attempt any* **2** *questions. Each question carries 12 marks.*

2. Give an algorithm to perform following operations in a singly linked list

(i) Insert a new node after a given node.

(ii) Delete last node.

3. Define Stack. Convert the expression infix to prefix using stack

$$A*(B+D)/E-F*(G+H/K)$$

4. Write a program to sort the following elements.

77, 49, 25, 12, 9, 33, 56, 81

using bubble sort.

5. Explain circular queue and double ended queue with example.

Section -C

Note : *Attempt any 2 questions. Each question carries 12 Marks.*

6. Define Hashing. What are the properties of a good hash function ? With necessary examples explain four different hashing techniques.

7. Create a B-Tree of order 5 by inserting the following elements :

3, 14,7, 1, 8, 5, 11, 17, 13, 16, 23, 12, 20, 26, 4, 6, 18, 24, 25, and 19.

8. Explain in brief about tree traversal. The inorder and preorder traversal of tree produces the following sequence of nodes

Inorder : EACKFHDBG

Preordar : FAEKCDHGB

Draw the tree T.

9. Explain in brief about Binary search Tree ? Construct a binary search tree from the given value.

45, 23, 29, 85, 92, 7, 11, 35, 49 and 51