DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Winter Examination – 2022

Course: B. Tech. Branch :Electronics & Computer Engineering Semester :III

Subject Code & Name: (BTECPC303) Programming, Data Structures and Algorithm Using C

Max Marks: 60 **Date: 13.03.2023** **Duration: 3 Hr.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		**12**
A)	Classify Data Structures. State various operations that can be performed on data structure. Explain deletion operation in short.	L2/CO1	**6**
B)	Write a C program to find largest and smallest element from given array data structure.	L2/CO1	**6**
C)	Explain with diagram an insertion of a node at beginning, at the end and at the specified position for singly linked list.	L1/CO1	**6**
Q.2	**Solve Any Two of the following.**		**12**
A)	Write a C program to implement operations of stack. Use dynamic implementation for the same.	L3/CO2	**6**
B)	Differentiate between stack and queue *(min 6 points including diagrams)*	L4/CO2	**6**
C)	Convert each of the following infix expression into *prefix* and *postfix* expression ***i) A + B / C – D * E*** ***ii) [(A+B) + C/D * E^F / G]***	L3/CO2	**6**
Q. 3	**Solve Any Two of the following.**		**12**
A)	Write a C program to implement following operations on simple queue i) isFull and isEmpty ii) Inserting an element iii) Deleting an element	L2/CO3	**6**
B)	What is circular queue? Consider the following circular queue having a maximum capacity of six elements, *Where '_' denote empty memory space.* *Front = 2, Rear = 4; Queue: _, L, M, N, _, _* Describe the queue with the following operations a) Add element *'O'* d) Add elements *'Q', 'R', 'S'* b) Add element *'P'* d) Delete one element. c) Delete two elements.	L3/CO3	**6**
C)	Write short note on i) Priority Queue. ii) Deque.	L2/CO3	**6**

Q.4 Solve Any Two of the following. **12**

A) Explain Binary Search Tree. Draw the resulting BST for following data element *20,10,18,4,8,5,13,16,17,1,27*

OR

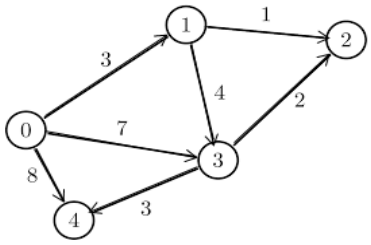
Explain various graph representation methods

L2/CO4 **6**

B) Create a binary Tree for given inorder and preorder of a tree
Inorder: E A C K F H D B G
Preorder: F A E K C D H G B

L3/CO4 **6**

C) a) With reference to Figure-1 define the following,
i) Graph ii) Weighted Graph iii) Degree of a Graph
iv) Adjacent Vertex v) Path vi) Connected Graph



L1/CO4 **6**

Q. 5 Solve Any Two of the following. **12**

A) Define algorithm. Explain algorithm analysis with help of worst, average and best case with suitable example.

L2/CO5 **6**

B) Write a c program for searching an element in a given array using Binary Search method.

L2/CO5 **6**

C) Define sorting. State various sorting technique. Write an algorithm of bubble sort technique.

L2/CO5 **6**

***** End *****