DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular & Supplementary Winter Examination-2023

Course: B. Tech. **Semester : VII**

Branch : Electronics Engg. / E & TC Engg. / Electronics and Communication Engg.

Subject Code & Name: (BTEXOE704C/BTETOE704C) Data Structure & Algorithms using Java Programming

Max Marks: 60 **Date:09-01-24** **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)	Differentiate between primitive and non-primitive data types, providing examples of each.	CO1	**6**
B)	Write a Java function to delete the last element from an array.	CO3	**6**
C)	Compare Big-O, Big-Theta, and Big-Omega notations. Provide examples to illustrate each.	CO1	**6**
Q.2	**Solve Any Two of the following.**		**12**
A)	Explain the linear search technique. What are its advantages and disadvantages?	CO2	**6**
B)	Explain the algorithm for pushing an element onto a stack and analyze its time complexity.	CO4	**6**
C)	Describe the algorithm for enqueueing an element in a simple queue and analyze its time complexity.	CO4	**6**
Q. 3	**Solve Any Two of the following.**		**12**
A)	Discuss the advantages and disadvantages of using a singly linked list over other data structures.	CO3	**6**
B)	Provide algorithms for inserting a new node at the beginning and end of a circular linked list.	CO3	**6**
C)	Write a Java program to reverse a singly linked list.	CO3	**6**
Q.4	**Solve Any Two of the following.**		**12**
A)	With suitable example explain the concepts of edges, root, parent, child, leaf, and depth in a tree.	CO4	**6**
B)	Differentiate between a full binary tree and a complete binary tree.	CO4	**6**
C)	Define a B Tree and explain its properties.	CO4	**6**

Q. 5	**Solve Any Two of the following.**		**12**
A)	With suitable example explain the working principle of the Selection Sort algorithm.	CO5	**6**
B)	What is hashing? Provide comprehensive explanation of its role in data storage and retrieval.	CO5	**6**
C)	With suitable examples explain following graph terminologies. Vertices, Edges, and Degree.	CO4	**6**

***** End *****