DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Semester Examination – 2023

Course: B. Tech. Branch : Computer Engineering and Allied Semester : III

Subject Code & Name: Data Structures [BTCOC303]

Max Marks: 60 Date: 14/08/2023 Duration: 03:00 Hrs.

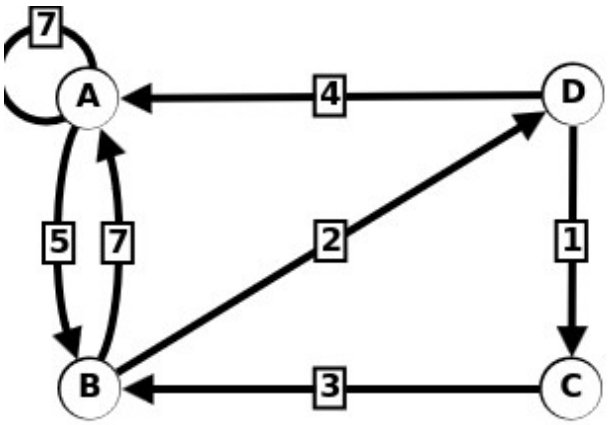
Instructions to the Students:

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)	Define the following terms: i) Classification of Data Structure ii) Abstract Data Types iii) Transpose of Matrix	**Remember**	
B)	What is the Sparse Matrix. Write a C program to convert a sparse matrix, an input provided by a user into its triplet representation.	**Understand**	
C)	Consider the following 4-digit employee numbers: 3205 and 7148. Find 2-digit hash address of each number using a) division method (m = 97); b) midsquare method; c) folding method without reversing.	**Application**	
Q.2	**Attempt the following questions.**		**[12]**
A)	Define Queue. Write an algorithm to perform an Enqueue and Dequeue operations on the Queue.	**Understand**	
B)	Write an algorithm to convert Infix expression to Postfix expression. Consider the following Infix expression Q and translate Q into its equivalent Postfix expression P. Q: A + (B * C – (D / E ↑ F) * G) * H	**Application**	
Q. 3	**Solve Any Two of the following.**		**[12]**
A)	Explain the following concepts: a) Garbage Collection b) Dynamic Memory Allocation	**Understand**	
B)	Write a pseudo code for the performing following operations in the Single Link List: a) Insert the elements at the end b) Delete the element from the beginning	**Understand**	
C)	Write a pseudo code for the performing following operations in the Circular Link List: a) Insert the elements at the beginning b) Delete the element from the end	**Understand**	

Q.4 Attempt the following questions. **[12]**

A) Consider the following weighted graph G. Find the shortest path between the nodes using Warshall's Algorithm. **Application**



B) Define the the following terms: **Application**

i) Siblings ii) Leaf Node iii) Ancestor of Node

Following numbers are inserted into an empty binary search tree. Find the final tree **T.**

25, 20, 10, 36, 22, 5, 1, 8, 30, 12, 15, 40, 28, 38, 48, 45, 50

Q. 5 Attempt the following questions. **[12]**

A) Write a pseudo code for Linear Searching. **Understand**

B) Consider the following array consisting of 8 elements. Use insertion sort to arrange the elements in the Ascending order. **Application**

77, 33, 44, 11, 88, 22, 66, 55

***** End *****