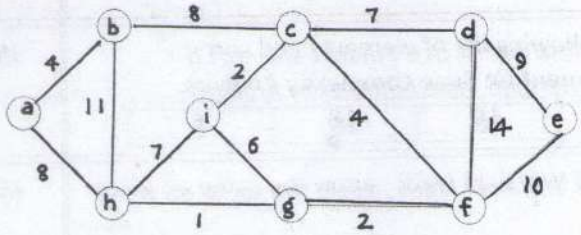
K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

~~Nov – Dec 2024~~ Jan/Feb 2025

B. Tech. Program: Electronics and Telecommunication Engineering — Scheme II-B
~~Regular~~ Examination: TY Supplementary — Semester: V
Course Code: **EXDLC5054** and Course Name:**Data Structures and Algorithms**
Date of Exam: 06-02-25 Duration: 02.5 Hours — Max. Marks: 60

Instructions:
(1)All questions are compulsory.
(2)Draw neat diagrams wherever applicable.
(3)Assume suitable data, if necessary.

Q. No.	Question	Max. Marks	CO	BT level
Q 1	**Solve any two questions out of three: (05 marks each)**	**10**		
a)	What are performance Characteristics of algorithms? Explain Complexity of algorithm with example?	5	1	U
b)	Write an Algorithm to add node at the middle of a singly linked list, example with an example	5	3	Ap
c)	Create Minimum Spanning Tree using Prim Algorithm. Explain Spanning Tree concept 	5	4	Ap
Q 2	**Solve any two questions out of three: (05 marks each)**	**10**		
a)	Explain priority queue? List the advantage and applications of Priority Queue	5	2	U
b)	Explain Stack as an ADT, and Stack operation	5	2	U
c)	Discuss the Algorithm for conversion of Infix to Postfix and Convert infix string **A*(B+C)*D** into a postfix string using stack.	5	2	Ap
Q.3	**Solve any two questions out of three. (10 marks each)**	**20**		
a)	What is a Doubly Linked List, discuss the operations on Doubly Linked List and write an algorithm to insert a new node at the beginning of existing Doubly Linked list	10	3	Ap
b)	What is an AVL tree. Construct an AVL tree for following data: **50, 25, 10, 5, 7, 3, 30, 20, 8, 15.**	10	4	Ap

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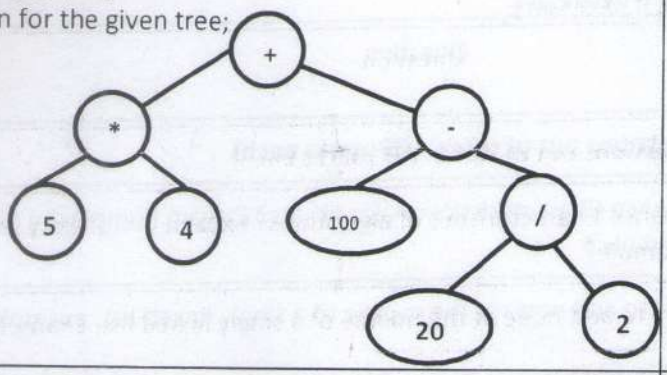
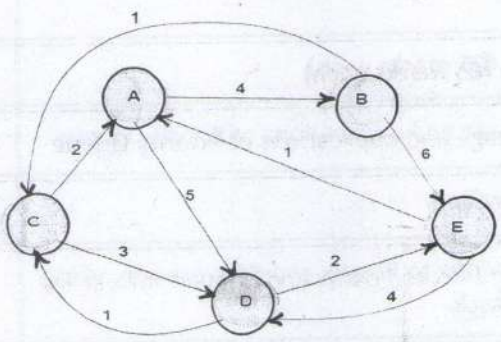
c)	What is a Binary Search Tree (BST). Construct a tree from given Inorder = **[1, 2, 4, 5, 7, 3, 6, 8]** and Preorder = **[4, 2, 7, 5, 1, 8, 6, 3]** Evaluate the expression for the given tree; 	10	4	Ap
Q.4	**Solve any two questions out of three. (10 marks each)**	**20**		
a)	Explain Merge Sort. Consider the following list of elements and sort it ascending order using bubble sort, mention Time complexity Analysis. **75 | 16 | 80 | 10 | 18 | 6**	10	5	Ap
b)	Explain all pairs shortest path (Flyod Warshall Algo) , apply the same on given network 	10	6	Ap
c)	What is Dynamic Programming, explain 0/1 Knapsack Algorithm and implement 0/1 Knapsack Algorithm on the data mentioned below: Given: Weights = { 3, 4, 6, 5 } Profit = { 2, 3, 1, 4 } W=8 N=4 *N: No. of items* *W: Final weight of the bag*	10	6	Ap

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