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

Nov – Dec 2024

B. Tech. Program: Electronics and Telecommunication Engineering — Scheme II-B
Regular Examination: TY — Semester: V
Course Code: EXDLC5054 and Course Name: Data Structures and Algorithms
Date of Exam: 29-11-24 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)	Explain Worst-case, Average-case, Best-case, and Amortized Time Complexity?	5	1	U
b)	Write an Algorithm to add node at the end of a singly linked list, example with an example	5	3	U
c)	Create an AVL tree using the following sequence of data: **16, 27, 9, 11, 36, 54, 81, 63, 72.**	5	4	Ap
Q 2	**Solve any two questions out of three: (05 marks each)**	**10**		
a)	Write an algorithm to perform push and pop operation on stack using suitable example.	5	2	U
b)	Write a algorithm to perform circular queue operation using suitable example	5	2	U
c)	Discuss the Algorithm for conversion of Infix to Postfix and Convert infix string **(A * B) + (C / D) – (D + E)** 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 Circular Linked List, discuss the operations on circular Linked List and write an algorithm to insert a new node at the beginning of existing Circular Linked list	10	3	Ap
b)	Create a BST tree for the following data arriving in sequence: **90, 27, 7, 9, 18, 21, 3, 4, 16, 11, 21, 72.**	10	4	Ap
c)	What is a Binary Search Tree (BST). Construct a tree from given Inorder = **[2, 5, 6, 10, 12, 14, 15]** and Preorder = **[10, 5, 2, 6, 14, 12, 15]**	10	4	Ap

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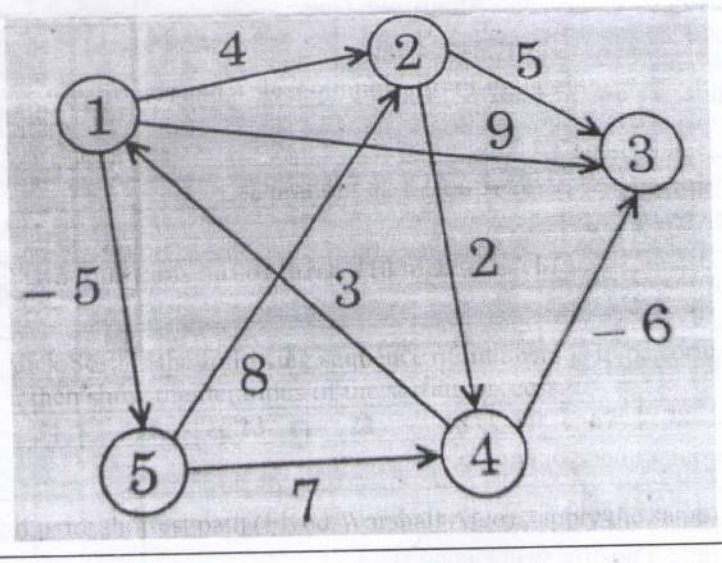
Q.4	**Solve any two questions out of three. (10 marks each)**	**20**		
a)	Explain quick Sort. If the following sequence of numbers is to be sorted using quick sort, then show the iterations of the sorting process. 42 | 34 | 75 | 23 | 21 | 18 | 90 | 67 | 78	10	5	Ap
b)	Explain all pairs shortest path (Flyod Warshall Algo) , apply the same on given network 	10		Ap
c)	Write Short note on 0/1 Knapsack Algorithm and explain Travelling salesman Problem with an example	10	6	Ap

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