

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

**End Semester Exam**

Nov – Dec 2021

B. Tech: Electronics and Telecommunication

Examination: TY

Semester: V

**Course Code:** 1UEXDLC5054

**Course Name:** Data Structure and Algorithms

**Duration:** 03 Hours

**Max. Marks:** 60

Instructions:

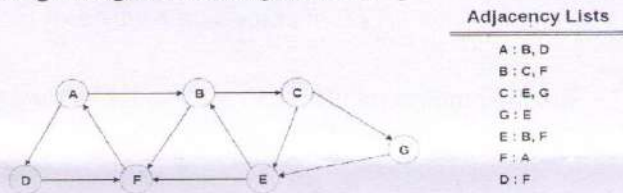
- (1) All questions are compulsory.
- (2) Draw neat diagrams wherever applicable.
- (3) Assume suitable data, if necessary.

Q. No.	Question	Max. Marks	CO	BT Level
Q 1	Solve any six questions out of eight:	12		
i)	What do you understand by Data Structure? Give classification of Data Structure.		1	R
ii)	Explain a linked list with its various types.		2	U
iii)	Define a double ended queue and give its applications.		2	R
iv)	Explain with example i) Complete Binary Tree ii) Height of tree		2	U
v)	Define Graph data structure. List its type with an example.		2	R
vi)	What are the features of an efficient algorithm?		3	R
vii)	What are the various factors to be considered in deciding a sorting algorithm?		5	R
viii)	Explain flow shop scheduling with example.		6	U

**Q.2 Solve any four questions out of six.**

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- i) Explain the Concept of Files, types of files and its operation. 1 R
- ii) What is a doubly linked list? Explain insert operation in doubly linked list. 2 R
- iii) What are the ways of traversing a graph? Traverse the graph G using breadth-first search algorithm beginning at a starting node A. 2,3 U



- iv) Explain insertion sort algorithm with example. 3,4 Ap
- v) Explain Strassen's Matrix Multiplication Algorithm with example. 5 R
- vi) Write short note on Travelling salesman problem. 6 R

**Q.3 Solve any two questions out of three.**

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- i) List different applications of stack data structure and write an algorithm to convert the infix expression into its equivalent postfix expression. Hence show the conversion of the infix expression " $9 - ((3 * 4) + 8) / 4$ " into postfix notation using stack. 1 Ap
- ii) What do you understand by Analysis of algorithm? Which types of analysis can be performed? Explain Asymptotic Notations. 3 U
- iii) Write an algorithm for merge sort and comment on its complexity. 5 U

<b>Q.4</b>	<b>Solve any two questions out of three.</b>	<b>16</b>	
i)	What is singly linked list? Explain traversal operation in singly linked list.	2	U
ii)	What is Binary Search Tree (BST)? Explain the following operations in BST: i) Searching a value in BST ii) Inserting a new value in BST.	2,3	R
iii)	Explain all pair shortest path algorithm in detail.	6	Ap