Reg. No. : | | | | | | | | | | | | |

Question Paper Code: U4829

B.E./B.Tech. DEGREE EXAMINATION, APRIL 2024

Fourth Semester

Electronics and Communication Engineering

21UIT429 - INTRODUCTION TO DATA STRUCTURES AND ALGORITHMS

(Regulations 2021)

Duration: Three hours Maximum: 100 Marks

Answer All Questions

PART A - (10 x 2 = 20 Marks)

1.	What is an Array in Data Structure? Why do we need arrays?	CO1-U
2.	Write the routine for insertion operation of singly linked list.	CO1-U
3.	Give the linked representation of the following polynomial: $7x^3 - 8x^2 + 3x + 4$	CO3-AN
4.	Why quicksort is preferred for arrays and merge sort for linked lists? Justify your answer.	CO2-App
5.	Define stack and list the application.	CO1-U
6	Define queue with example.	CO1-U
7	Write a program to calculate the number of items in queues.	CO2-App
8	What is the postfix form of this expression? (A+B)*(C/D).	CO2-App
9	Define Trees with example	CO1-U
10	Draw a complete undirected graph having five nodes.	CO2-App

PART – B (5 x 16= 80 Marks)

11.	(a)	Explain the classification of data structures.	CO1-U	(16)
		Or		
	(b)	Explain the linked list and its types with example.	CO1-U	(16)

12. (a) Develop an algorithm and diagrammatic illustrations the various operations that can be performed on a queue using array. CO1-U (16)

Or

(b) Develop an algorithm and diagrammatic illustrations the various operations that can be performed on a queue using linked list. CO1-U (16)

13. (a) Explain the linked representation of queue with example CO1-U (16)

Or

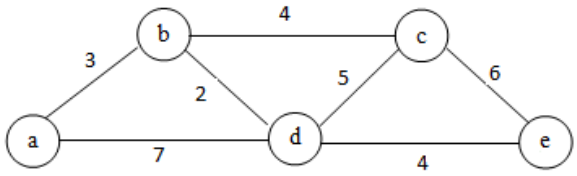
(b) Explain the array representation of queue with example. CO1-U (16)

14. (a) Construct a Binary Search tree from the following set of elements 25, 14, 2, 45, 78, 1, 3, 4, 5, 20, 11, 56, 90, 85, 79, 65 and traverse the tree built in In-order, Post order and Preorder. CO2-App (16)

Or

(b) Illustrate with the all rotations and Construct an AVL tree by inserting the following elements in the given order 63, 9, 19, 27, 18, 108, 99, 81 CO2-App (16)

15. (a) Find a shortest path between any two vertices of a weighted graph or digraph and Estimate the efficiency of Dijkstra's Algorithm. CO2-App (16)



Or

(b) Apply Prim's algorithm to find the minimum spanning tree for the following graph and write an algorithm of Prim's Algorithm. CO2-App (16)