Reg. No.											

Question Paper Code	12341

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2023
Third Semester
Information Technology
(Common to Computer Science and Engineering, Computer Science and Engineering (IoT), Computer Science and Engineering (Cyber Security), Computer and Communication Engineering, M.Tech.- Computer Science and Engineering & Sixth Semester - Electrical and Electronics Engineering)
20ITPC301 - DATA STRUCTURES
(Regulations 2020)

Duration: 3 Hours   Max. Marks: 100

PART - A (10 × 2 = 20 Marks)
Answer ALL Questions

		Marks, K-Level, CO
1.	Write the routine to pop an element from a stack.	*2,K2,CO1*
2.	Define Priority Queue. How Priority Queue is implemented?	*2,K1,CO1*
3.	Write the advantages of Array over Linked List.	*2,K2,CO2*
4.	How can the Doubly Linked List be represented?	*2,K1,CO2*
5.	List the properties of B+ tree.	*2,K1,CO3*
6.	What are Threaded Binary Trees? Represent it with a neat sketch.	*2,K2,CO3*
7.	State the Principle of Topological sorting.	*2,K1,CO4*
8.	Define graph and its representation. Give two applications of graphs.	*2,K1,CO4*
9.	What are the various factors to be considered in deciding a sorting algorithm?	*2,K1,CO5*
10.	What do you mean by internal and external sorting?	*2,K1,CO5*

PART - B (5 × 13 = 65 Marks)
Answer ALL Questions

11.	a)	Explain how to evaluate arithmetic expressions using Stack.	*13,K2,CO1*

OR

	b)	Explain the implementation of Circular Queue ADT.	*13,K2,CO1*

| 12.	a)	Explain the operations and implementation of Circular Linked List.	*13,K2,CO2*

OR

b) Explain the implementation of the following operations in a Singly Linked List.   *13,K2,CO2*
  (i) Inserting a node after a given node.
(ii) Deleting a last node.

13. a) Construct an AVL tree with the values 3,1,4,5,9,2,8,7,0 into an initially empty tree. Write the code for inserting into an AVL tree.   *13,K3,CO3*

<div align="center">OR</div>

b) Explain insert and delete operations of heap in detail. Show the result of inserting 15, 17, 6, 19, 11, 10, 13, 20, 8, 14, 12 one at a time into an initially empty binary min heap. Also show the result of performing three delete Min operations.   *13,K2,CO3*

14. a) Explain Minimum Spanning tree using Prim's algorithm for the following graph with C Program.   *13,K3,CO4*
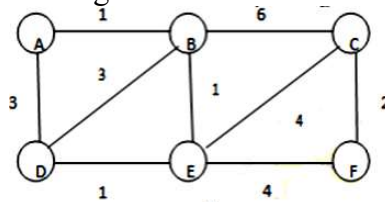
<div align="center">OR</div>

b) Explain the Breadth First Search (BFS) for the following graph with C Program.   *13,K3,CO4*
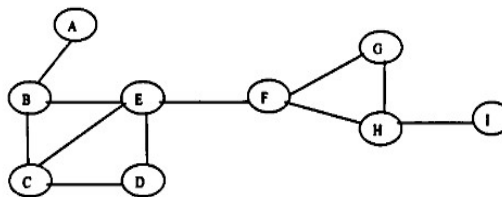
15. a) Perform Insertion sort for the following array: 39,9,45,63,18,81,10,8,54,72,36.   *13,K2,CO5*

<div align="center">OR</div>

b) Explain Radix Sort implementation with an example.   *13,K2,CO5*

<div align="center">PART - C (1 × 15 = 15 Marks)</div>

16. a) Explain Hash function. Show the method to insert the given set of data to enter into hash table without collision: 2, 3, 5, 7, 11, 13, 15, 6, 4, 24, 43, 46, 55, 67.   *15,K2,CO6*

<div align="center">OR</div>

b) Describe Rehashing and Extendible Hashing technique with suitable example.   *15,K2,CO6*