Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025

Third Semester

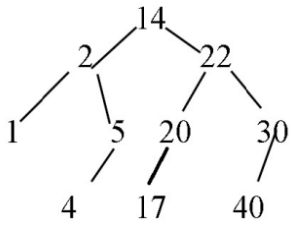
Computer Science and Engineering

CS3301 / UCST24301- Data Structures

Regulations – 2021 & 2024

Duration : 3 Hrs *Maximum : 100 Marks*

*PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)*

Q.No	*Questions*	*BTL*	*CO*	*Marks*
1.	Compare linear and nonlinear data structures.	L2	1	2
2.	List out the advantage of circular linked list.	L1	1	2
3.	Evaluate the following arithmetic expressions using stack : 2 3 1 * + 9 –	L3	2	2
4.	Define Double Ended Queue.	L1	2	2
5.	Identify the preorder tree traversal ordering for the following tree: 	L3	3	2
6.	Define a fully binary tree. Give an example.	L1	3	2
7.	Compare B and B+ tree.	L2	4	2
8.	State the purpose of Dijikstra's algorithm.	L1	4	2
9.	Compare linear and binary search.	L2	5	2
10.	Identify which sorting algorithm is best if the list is already sorted. Why?	L3	5	2

*PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)*

Q.No			*Questions*	*BLT*	*CO*	*Marks*
11.	a		Illustrate the various operations of a singly linked list with pseudocode and appropriate diagrams.	L2	1	16
			Or			
	b		Explain how a polynomial can be represented using a linked list data structure and write the algorithm to add two polynomials.	L2	1	16
12.	a	i	Develop an ADT to implement stack of size N using an array. The elements in the stack are to be integers. The operations to be supported are PUSH, POP and DISPLAY. Take into account the exceptions of stack overflow and stack underflow.	L3	2	8
		ii	Trace the algorithm to convert the infix expression "3-(4/2) + (1*5) + 6" to a postfix expression using stack.	L3	2	8
			Or			

	b	i	Develop an ADT to implement queue. The elements in the stack are to be names of the customers.	L3	2	8
		ii	Model the circular queue behavior for size 5 when the following operations occur: Enqueue(1), Enqueue(2), Enqueue(3), Enqueue(4), Dequeue(), Dequeue(), Enqueue(5), Enqueue(6), Enqueue(7)	L3	2	8
13.	a	i	Construct a binary search tree step by step by inserting the following numbers 45,26,10,60,70,30,40 into an empty binary search tree. Delete keys 10,60 and 45 one after the other and show the trees at each step.	L3	3	8
		ii	What are AVL trees? Illustrate the different rotations performed on an AVL tree.	L2	3	8
			Or			
	b	i	Construct a binary min heap by showing the result of inserting the values 15,17,6,19,11,10,13,20,8,14,12 one at a time into an initially empty binary min heap.	L3	3	8
		ii	Explain the construction of expression tree with example.	L2	3	8
14.	a		Illustrate depth-first search and breadth-first search traversal of a graph with suitable examples.	L2	4	16
			Or			
	b		Explain the Kruskal's algorithm for minimum spanning tree. Give an example.	L2	4	16
15.	a		Identify the sorting algorithm on which split and merge concept is applied. How these two operations are performed on the following numbers 15,17,6,19,11,10,13,20,8,14,12, so that the user will finally have all the values in a sorted manner.	L5	5	16
			Or			
	b		A hash table of size 9 uses the hash function h(k)=k mod 9. Keys 5, 28, 19, 15, 20, 33, 12, 17, and 10 are inserted in sequence. Determine the final arrangement of the hash table when collisions are handled using any two different Open Addressing strategies.	L5	5	16