Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY 2025

Third Semester

Computer Science and Engineering

CS3301-Data Structures

Regulations - 2021

Duration : 3 Hrs ***Maximum: 100 Marks***

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

Q.No	*Questions*	*BLT*	*CO*	*Marks*
1.	Compare linear and non-linear data structures with an example.	L2	1	2
2.	Infer the usage of multilists.	L2	1	2
3.	List some applications of queue.	L1	2	2
4.	Compare the working of stack and queue data structure.	L2	2	2
5.	If the depth of the binary key is k, the maximum number of nodes in the binary tree is 2^{K-1}. Justify.	L2	3	2
6.	Create an expression tree for the expression a*(b+c)+((d+e*f)*g).	L3	3	2
7.	What is Biconnectivity?	L2	4	2
8.	Outline a directed graph with an example.	L2	4	2
9.	Which sorting algorithm is best if the list is already sorted? Why?	L2	5	2
10.	Why shell sort is known diminishing increment sort?	L2	5	2

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

Q.No			*Questions*	*BLT*	*CO*	*Marks*
11.	a	i	Express an algorithm to add two polynomials having m and n terms respectively using linked list with an example.	L4	1	8
		ii	Explain how linked list are used for sorting the following set of numbers using radix sort. A={432,8,530,90,88,231,1145,677,199}.	L3	1	8
			Or			
	b	i	Write a procedure to deleting the last node from a circular linked list.	L2	1	8
		ii	Develop a program to add the values of the nodes of a linked list and then calculate the mean.	L2	1	8
12.	a	i	Write the procedure to convert the infix expression to postfix expression and steps involved in evaluating the postfix expression. Convert the expression A- (B/C + (D% E*F)/G)*H to postfix form.	L3	2	8
		ii	Identify how stacks are used for checking whether an expression is balanced or not for every right and left brace, bracket and	L2	2	8

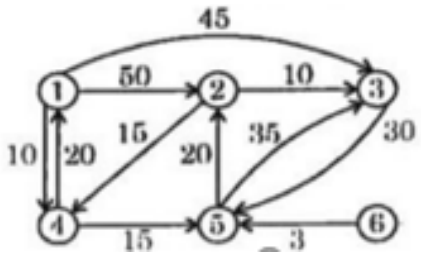
parenthesis.

Or

	b	i	Write an algorithm for push and pop operations on stack using linked list.	L3	2	8
		ii	Develop a procedure to insert an element to circular queue and delete an element from a circular queue using array implementation.	L3	2	8
13.	a	i	Identify the types of priority queue. Explain about min heap insertion and deletion operations.	L3	3	8
		ii	Create a binary search tree for the following numbers start from an empty binary search tree. 45,26,10,60,70,30,40 delete keys 10,60 and 45 one after the other and show the trees at each stage.	L3	3	8

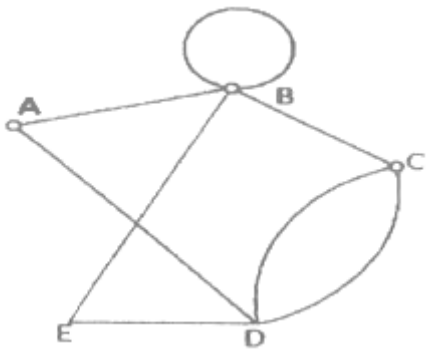
Or

	b	i	For the Given AVL tree, Draw the resulting balanced tree step by step after 5 is removed. Label each node with balance factor.	L3	3	8
		ii	Distinguish between binary tree, general tree and binary search tree and also give an example for each.	L4	3	8
14.	a	i	Write the insertion algorithm for binary search tree and analyze its complexity.	L3	4	8
		ii	State dijkstra's algorithm and identify the minimum cost and shortest path for the following graph:	L3	4	8



Or

	b	i	Find a Euler path or a Euler circuit using DFS for the following graph.	L3	4	8



		ii	Describe topological sorting with an example.	L2	4	8

15.	a	i	Write a routine for Insertion sort and sort the following sequence using Insertion Sort: 3,10,4,2,8,6,5,1.	L3	5	8
		ii	Discuss about linear probing collision resolution technique with an example.	L2	5	8
			Or			
	b	i	Write the merge sort algorithm and show how it arranges the following array of ten elements in sorted order. Analyze the complexity of the algorithm: A[1:10] = (31,28,16,35,27,42,86,33,40,58).	L3	5	8
		ii	Define extensible hashing and demonstrate with an example.	L2	5	8