Reg.No.:												

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 50016

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2024
Third Semester
Computer Science and Engineering
U19CS304 – DATA STRUCTURES
(Common to ECE)
(Regulation 2019)

Time: Three Hours Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

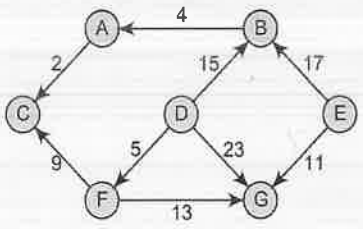
(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Write the node structure of linked list.	2	K1	CO1
2.	Differentiate linear array and linked list.	2	K2	CO1
3.	Define stack and write its operations.	2	K1	CO2
4.	Identify the advantage of circular queue over linear queue.	2	K2	CO2
5.	List some of the non-linear data structures and define one of them.	2	K1	CO3
6.	How binary search tree insertion is done and names some of binary search trees.	2	K2	CO3
7.	Differentiate between directed and an undirected graph.	2	K2	CO4
8.	State minimum spanning tree (MST).	2	K1	CO4
9.	Recall collision in hashing.	2	K1	CO5
10.	Compare linear search and binary search.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)		State the polynomial representation for given expression $6x^3+9x^2+7x+1$ using linked list. Write procedure to add and multiply two polynomial and explain it with above expression.	13	K2	CO1
			(OR)			
	b)	i.	Create a singly linked list of elements :1,4,8,10,15. Starting from the second node delete all the alternate nodes of it.	8	K3	CO1
		ii.	Display the elements before and after deletion.	5		
12.	a)		Examine how stack is used to convert infix to postfix expression with routine and convert the given Infix expression into postfix notation: A+B*C-D/E+F.	13	K3	CO2
			(OR)			
	b)		Illustrate the Circular Queue and its operation with example. Give the application of Circular Queue.	13	K2	CO2
13.	a)	i.	Construct a binary search tree for the value 45, 56, 39, 12, 34, 32, 10, 78, 67, 89, 17.Give the preorder, inorder and postorder traversal of the resultant BST.	8	K3	CO3
		ii.	Explain deletion in BST (include all the cases) with example.	5		
			(OR)			
	b)		Write a routine for AVL tree insertion. Insert the following elements in the empty tree and how do you balance the tree after each element insertion 63, 9, 19, 27, 18, 108, 99, 81 with various rotations.	13	K4	CO3
14.	a)		Write about directed acyclic graph and explain topological sorting with an example graph.	13	K2	CO4
			(OR)			
	b)		Consider the graph G given below. Taking D as the initial node, execute the Dijkstra's algorithm on it.	13	K4	CO4



15.	a)	Explain the concept of quick sort with an example of sorting the array: [34,7,23,32,5,62,32,45] and tell how does it choose the pivot element.	13	K3	CO5
		(OR)			
	b)	Describe the different techniques used for collision resolution. Write short notes on hashing and how it is useful.	13	K2	CO5

PART – C

(1 x 15 = 15Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Consider a circular linked list data structure used to manage a playlist of songs in a music application. Assume each node in the circular linked list represents a song, containing fields for the songs title, artist and duration.			
		i. Draw the structure of the node in a circular linked list used for this playlist and include necessary pointers and data fields.	8	K5	CO1
		ii. Describe how you would delete a song from the playlist based on the song's title and also write the algorithm for it.	7		
		(OR)			
	b)	A telecommunications company wants to lay down cables connecting several cities while minimizing costs. Given a graph where the edges represent possible connections between cities and their costs, compare and contrast Prim's and Kruskal's algorithms for finding the Minimum Spanning Tree. Discuss scenarios where one algorithm may be preferred over the other.	15	K5	CO4