



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

Question Paper Code: 130010

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2024

Third Semester

Computer Science and Technology

U19CT301 – DATA STRUCTURES AND ALGORITHMS

(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)

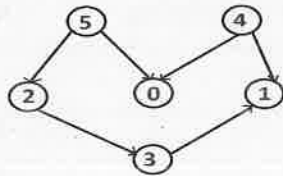
Q.No.	Questions	Marks	KL	CO
1.	Compare linear and Non-linear data structures.	2	K2	CO1
2.	Differentiate arrays and linked lists.	2	K2	CO1
3.	Recall the operation of Dequeue.	2	K1	CO2
4.	List the application of stack.	2	K1	CO2
5.	Draw a binary search tree for the following input lists. 60, 25, 75, 15, 33, 44.	2	K2	CO3
6.	Compare binary tree and binary search tree.	2	K2	CO3
7.	Define minimum spanning tree and write its properties.	2	K1	CO4
8.	List out the applications of graph.	2	K1	CO4
9.	What is collision? What are the different collision resolving techniques?	2	K1	CO5
10.	Write down the best and worst case complexity of Quick and Merge sort.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

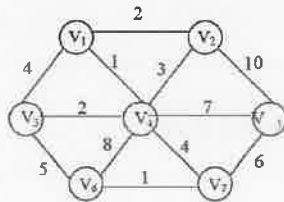
Q.No.	Questions	Marks	KL	CO
11. a)	Describe the procedures to create, insert and delete node from singly link.	13	K2	CO1
(OR)				
b) i.	Explain with example routine to insert and delete operation of circular linked list.	6	K2	CO1
ii.	Summarize the applications of linked lists.	7	K2	

12. a) Explain the operations and the implementation of Stack ADT using Linked list. 13 K2 CO2
- (OR)
- b) i. Convert following infix expressions into postfix with detailed procedure $P + (Q * R - F / J * G) + K$ 7 K3 CO2
- ii. Organize the function of priority queue of postfix expression with example. 6
13. a) i. Describe the various tree traversal algorithms. 7 K2 CO3
- ii. Explain briefly about different AVL tree rotations. 6 K2 CO3
- (OR)
- b) i. Describe B-tree with its properties. 5 K2 CO3
- ii. Perform search, insertion and deletion operation in B-tree. 8
14. a) Construct the Topological sort with algorithm using the Graph. 13 K3 CO4



(OR)

- b) Write down the prim's algorithm and find the minimum spanning tree for the following graph. 13 K3 CO4



15. a) Describe the Divide and Conquer method of Merge sort with example. 13 K2 CO5
- (OR)
- b) i. Sort the elements using Shell sort 35,33,42,10,14,19,27,44. 7 K3 CO5
- ii. Explain the procedure for Insertion sort. 6 K3

PART – C

(1 x 15 = 15Marks)

- | Q.No. | Questions | Marks | KL | CO |
|--------|---|-------|----|-----|
| 16. a) | Develop an algorithm for Binary heap construction. With an example. Analyze its performance complexities. | 15 | K3 | CO2 |
| (OR) | | | | |
| b) | Discuss how to perform sorting in quick sort by using appropriate pivot element with a suitable example. | 15 | K3 | CO5 |