

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Question Paper Code : 40916

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2024.

Third Semester

Computer Science and Engineering

CS 3301 — DATA STRUCTURES

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define polynomial ADT.
2. Identify how multidimensional array can be represented in memory.
3. Distinguish between static data structure and dynamic data structures.
4. List the operations of the stack.
5. Define binary heap.
6. Define threaded binary tree.
7. List out the commonly used graph representations.
8. Define Euler's cycle in a graph.
9. Mention the types of searching.
10. What is Rehashing?

PART B — (5 × 13 = 65 marks)

11. (a) Explain the operation of traversing linked list. Write the algorithm and give an example.

Or

- (b) Elaborate the steps to implement following operations of singly linked list.
- | | |
|----------------------|-----|
| (i) Traverse | (4) |
| (ii) Insert at front | (3) |
| (iii) Insert at any | (3) |
| (iv) Insert at end | (3) |

12. (a) Define stack? Explain the steps to implement (6)
(i) Stack using arrays (6)
(ii) Stack using linked list. (7)

Or

- (b) (i) Write an algorithm to insert and delete an element from a simple queue. (8)
(ii) Explain FIFO approach. (5)
13. (a) How to Insert and delete an element into a binary search tree and write down the pseudo code with an example.

Or

- (b) Write an algorithm for preorder, inorder and postorder traversal of a binary tree.
14. (a) Formulate an algorithm to find the shortest path using Dijkstra's algorithm and explain with example.

Or

- (b) Explain weighted and unweighted shortest path algorithms.
15. (a) Write an algorithm to implement selection sort with suitable example.

Or

- (b) Explain Extendible hashing in detail.

PART C — (1 × 15 = 15 marks)

16. (a) Explain the implementation of circular queue using array. How an "empty queue" is distinguished from a "full queue"? Write necessary functions to perform all valid operations on circular queue.

Or

- (b) Construct the minimum spanning tree (MST) for the given graph (Fig. 16 (b)) using Kruskal's Algorithm. Find the minimum cost. [Fig. 16 (b): undirected weighted graph with vertices 1 to 7 and edges 1-2 = 28, 1-6 = 10, 2-7 = 14, 2-3 = 16, 3-4 = 12, 7-4 = 18, 7-5 = 24, 6-5 = 25, 5-4 = 22]
-