

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

Question Paper Code : 30091

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Second / Third Semester

Computer Science and Design

CD 3291 — DATA STRUCTURES AND ALGORITHMS

(Common to : Computer Science and Engineering (Artificial Intelligence and Machine Learning)/
Computer Science and Engineering (Cyber Security)/Computer and Communication Engineering/
Information Technology)

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define an algorithm. List some essential properties of algorithm.
2. Write about recursion.
3. Identify the data structures to represent Stack.
4. List out the advantages of circularly linked list.
5. Compare bubble sort and Insertion sort in terms of time Complexity.
6. Differentiate between linear search and binary search.
7. Define B - Tree. List its properties.
8. Write about the AVL tree.
9. Write the steps required to construct the minimum spanning tree.
10. What is bi - connected graph? Give an example.

PART B — (5 × 13 = 65 marks)

11. (a) Discuss in detail about different classification of algorithms.

Or

- (b) Elaborate about the asymptotic notations with appropriate examples.

12. (a) Explain the insertion operation in linked list. How nodes are inserted after a specified node.

Or

- (b) Explain Stack ADT and its operations.

13. (a) Discuss the common collision resolution strategies used in clothing hashing system.

Or

- (b) Write an algorithm to implement insertion sort with suitable example.
14. (a) How to insert and delete an element into a binary search tree and write down the code for the insertion routine with example.

Or

- (b) Describe the algorithms used to perform single and double rotation on AVL tree.
15. (a) Explain the various representation of graph with example in detail.

Or

- (b) Write an algorithm for greedy approach and give one real time example.

PART C — (1 × 15 = 15 marks)

16. (a) Construct an expression tree for the expression $(a + b * c) + ((d * e + 1) * g)$. Give the outputs when you apply preorder, inorder and postorder traversals.

Or

- (b) Construct the minimum spanning tree (MST) for the given graph using Prim's Algorithm. Find the Cost of Minimum Spanning Tree. [Figure: weighted undirected graph with edges 1-2 28, 1-6 10, 2-3 16, 2-7 14, 3-4 12, 4-5 22, 4-7 18, 5-6 25, 5-7 24]
-