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Question Paper Code : 11162

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2026.

Third Semester

Computer Science and Engineering

CS3301– DATA STRUCTURES

(Common to Electrical and Computer Engineering)

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is an abstract data type?
2. Define a singly linked list.
3. Convert the infix expression $(a + b) * (c - d)$ to prefix expression.
4. What is a queue data structure?
5. Define binary tree with an example.
6. Define a heap.
7. What is a directed graph? Give example.
8. Define an Euler circuit.
9. How insertion sort works?
10. What is hashing?

PART B — ($5 \times 13 = 65$ marks)

11. (a) What is a list ADT? Describe array-based implementation of a list ADT with an example.

Or

- (b) What is radix sort? Present the algorithm for radix sort. Validate the correctness of the algorithm with an example.

12. (a) Discuss the operations that can be performed on a stack ADT with an algorithm, example and diagrams.

Or

- (b) Describe the various operations of queue ADT with an example.

13. (a) Explain preorder, inorder and postorder traversal on a binary search tree (BST) algorithm with an example.

Or

- (b) Define AVL tree. Implement AVL tree using C.

14. (a) What is a B⁺ tree? Discuss the algorithm to insert a node into a B⁺ tree and delete a node from a B⁺ tree. Validate the correctness of the algorithm with an example.

Or

- (b) Explain breadth first search traversal and depth first search traversal of a graph with an example.

15. (a) Discuss the steps in the merge sort algorithm with an example.

Or

- (b) Explain about Hash function and separate chaining with an example.

PART C — ($1 \times 15 = 15$ marks)

16. (a) Describe the algorithm for evaluating a postfix expression using stack ADT with an example.

Or

- (b) Apply the quick sort algorithm to sort the following numbers in ascending order: 909, 99, 808, 88, 707, 77, 606, 66, 505, 55, 404, 44, 303, 33, 202, 22, 101, 11. Illustrate each step of the sorting process.