

Code No: **R231205**

R23

SET - 1

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY GURAJADA VIZIANAGARAM
I B. Tech II Semester Supplementary Examinations Dec 2025/Jan 2026

DATA STRUCTURES

(Common to CSE, IT, CSE(DS), CSE(AI), CSE(CS), CSE(AI&ML), CSE(AI&DS), AI&DS, AI&ML)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part A & Part B.

Part A is compulsory, Answer all questions.

In Part B, Answer any one question from each unit.

PART-A

(20 Marks)

- 1 a) Differentiate between linear search and binary search. [2]
- b) Explain about bubble sort. [2]
- c) What are the advantages of using linked list rather than Arrays? [2]
- d) Write a short note on circular linked list. [2]
- e) Convert $((A+B) * C - (D - E)) / (F + G)$ To Postfix and Prefix notation. [2]
- f) Why infix expression should be converted to Prefix / Postfix? [2]
- g) What is the difference between Queues and Stacks? [2]
- h) What is the condition to check for empty queue? [2]
- i) How many binary trees are possible with four nodes? [2]
- j) Differentiate between double Hashing and Rehashing? [2]

PART-B

(50 Marks)

Unit-1

- 2 a) Compare various sorting algorithms. [5]
- b) Explain the working principle of Selection Sort for the list given? [5]
221, 121, 322, 14, 103, 435, 345, 116

(OR)

- 3 a) Write an algorithm for Insertion sort and also analyze the time complexity. [5]
- b) Define an algorithm. Describe commonly used asymptotic notations and give their significance. [5]

Unit-2

- 4 a) Write an algorithm to insert a node at the end of a doubly linked list. [5]
- b) Write an algorithm to reversing a Single Linked List? [5]

(OR)

- 5 a) How to represent Sparse Matrix using Single Linked List? [5]
- b) Differentiate between doubly and circular linked lists. [5]

Unit-3

- 6 a) Convert the prefix expression $-/ab*+bcd$ into infix expression and then draw the corresponding expression tree [5]
b) How to calculate the factorial of n using stacks? [5]

(OR)

- 7 a) List out the applications of stack. Consider the usual algorithm for determining whether a sequence of parentheses is balanced. What is the maximum number of parentheses that will appear on the stack AT ANY ONE TIME when the algorithm analyzes: $((())(())())$? [10]

Unit-4

- 8 a) Give the structure of Queue ADT. Explain the operations in it. [5]
b) Write an algorithm to implement queue using stack. [5]

(OR)

- 9 a) How to represent Queues? Discuss. [5]
b) Write an algorithm for enqueue operation in queue implemented using linked list [5]

Unit-5

- 10 a) Consider the following tree as shown in Figure:1: [10]

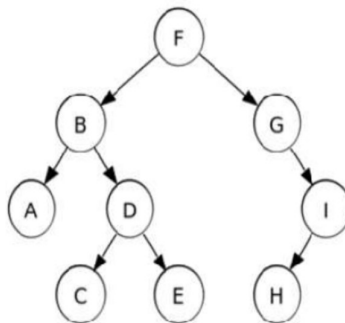


Figure: 1

- i) Post-order traversal of the tree
- ii) Level-order traversal of the tree
- iii) What is the depth of the tree?
- iv) "Is it a complete binary tree" – Justify

(OR)

- 11 a) Why rehashing is needed? What are the types of rehashing techniques available? Explain any one technique with examples? [5]
b) Explain modulo division and digit extraction hashing methods with an example. [5]
