



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

WINTER-2025	
Exam Seat No.:	
Academic Year:2025-2026	Semester:III
Class:SY	Program:B.Tech
Branch Code:INT	Pattern:2023
Name of Course:Data Structures & Algorithm	Course Code:2308202
Max. Marks:60	Duration:2.30 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains ____ page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

Marks CO

Question No. 1

- a) Develop pseudo C/C++ code demonstrating how to add a new node to the head and to the tail of a singly linked list. (6) CO2, CO5

Question No. 2

- b) Compare linear search and binary search in terms of working principle, performance, and requirements. Provide examples for both. (6) CO2

Question No. 3

- a) Convert the following expression from infix to postfix:
 $(P + Q) * (R + S - T)$ (5) CO2, CO5

OR

- b) How does static memory allocation differ from dynamic memory allocation? Describe with examples. (5) CO1, CO2, CO5
- c) Explain linear queue and circular queue with suitable examples. Also, give advantages of circular queue over linear queue. (5) CO2, CO5

OR

- d) Enumerate the various queue types and discuss any one queue with suitable example and operations. (5) CO2, CO5
- e) Write a function PUSH and POP in 'C' for stack using linked list. (6) CO2, CO5

OR

- f) In a queue implemented with a linked list, write the C functions for inserting an element at the rear and deleting an element from the front. (6) CO3

Question No. 4

- a) Using a real-life analogy, describe Binary Trees and their types. Support your explanation with suitable diagrams (5) CO3, CO5

OR

- b) Explain with suitable example how binary tree can be represented using: (5) CO3, CO5
i) Array ii) Linked List

- c) Write an iterative algorithm for inorder traversal of a binary tree. (5) CO3, CO5

OR

- d) Explain how BST structure helps in finding min and max values. Write the **non-recursive algorithm** for both. (5) CO3, CO4, CO5

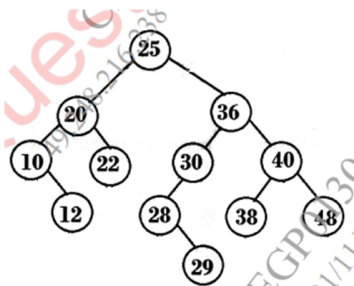
- e) Construct Binary search tree for the following : MAR, OCT, JAN, APR, NOV, FEB, MAY, DEC, JUN, AUG, JUL, SEP. (6) CO3, CO4, CO5

OR

- f) Define BST? Create a BST for the following data: 14, 15, 4, 9, 7, 18, 3, 5, 7. (6) CO3, CO5

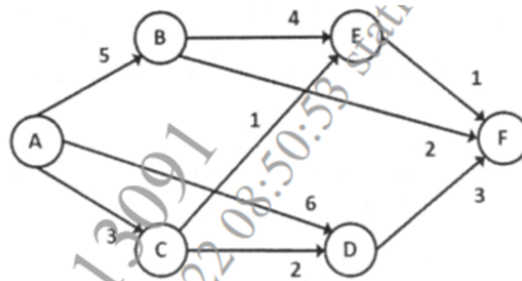
Question No. 5

- a) For a given tree, identify whether it is AVL tree or not? If it is not an AVL tree, convert it into balanced AVL tree. After conversion, insert node 15 and 24 in the tree. Delete node 20 and 22 from the tree. After insertion and deletion operation, if the tree is imbalanced, make it balanced AVL tree. (8) CO4, CO5



OR

- b) For the given graph, construct the Adjacency Matrix and Adjacency List. Discuss the limitation(s) of Adjacency Matrix. (8) CO4, CO5



- c) Using a min-heap, sort [50, 30, 40, 10, 20 and 35]. Show transformations. (8) CO4, CO5

OR

- d) Using a Max-heap, sort [5, 10, 7, 20, 15 and 12]. Show transformations. (8) CO1, CO4, CO5

..... End of question paper.....