

MSc (SS) DEGREE EXAMINATION MAY 2026

(Second Semester)

Branch - **SOFTWARE SYSTEMS (Five years Integrated)**

DATA STRUCTURES AND ALGORITHMS

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (5 x 1 = 5)

1. Abstract Data Type focuses on:
i) Implementation details ii) Memory allocation
iii) What operations are performed iv) Hardware structure
2. An expression is valid if:
i) Stack is empty at the end ii) Stack is never used
iii) Stack has elements at end iv) Only opening brackets exist
3. Which traversal visits nodes in the order: Left → Root → Right?
i) Pre-order ii) In-order iii) Post-order iv) Level order
4. What happens when deleting a node with two children in BST?
i) Delete directly ii) Ignore node
iii) Replace with inorder successor or predecessor iv) Move node to root
5. Which sorting algorithm uses divide and conquer strategy?
i) Bubble Sort ii) Selection Sort iii) Insertion Sort iv) Merge Sort

SECTION - B (15 Marks)

Answer **ALL** Questions

ALL Questions Carry **EQUAL** Marks (5 x 3 = 15)

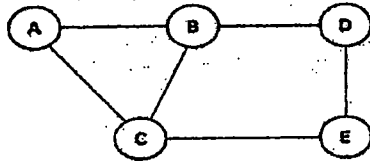
- 6 a. Recommend whether to use Primitive data type or Abstract data type to implement banking operations. Justify your answer.
OR
b. Discuss about dense matrix and sparse matrix. Recommend a suitable data structure to store sparse matrix.
- 7 a. Analyse the primitive operations in stack.
OR
b. Discuss the applications of the queue data structure.
- 8 a. Explain why singly linked list is better than a doubly linked list in few concepts.
OR
b. Organize a min heap with the following data: 5,4,6,7,1,2 and 8.

Cont...

- 9 a. Explain the properties of a binary search tree and justify how it differs from binary tree.

OR

- b. Illustrate how graphs are represented by adjacency matrix and adjacency list. For the given graph prepare the adjacency list and adjacency matrix



- 10 a. State the properties of efficient hashing function.

OR

- b. Apply radix sorting technique and sort the following numbers:
125, 365, 58, 72, 1, 6, 99, 53, 351

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks (5 x 6 = 30)

- 11 a. Evaluate Best, worst case and average case of an algorithm. Compare them with suitable example.

OR

- b. Analyse the insertion and deletion operations in a One dimensional array. List the advantages and disadvantages of using arrays.

- 12 a. Determine how recursion and expression handled using stack with an example.

OR

- b. Design a double ended queue and compare it with a single ended queue.

- 13 a. Interpret linked stack and linked queue with a suitable example.

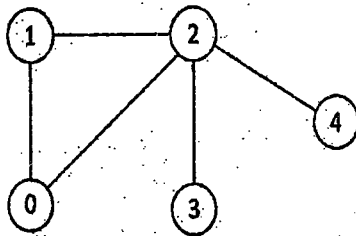
OR

- b. Design an expression tree with minimum of 7 nodes and construct in-order, pre-order and post-order expressions by traversing the expression tree.

- 14 a. Construct a Binary search tree with 5, 8, 10, 16, 4, 2, 7, 11. After completing the insertion delete the number 8.

OR

- b. Construct DFS and BFS for the following graph.



- 15 a. Analyse the collision resolution technique in linear probing with suitable example.

OR

- b. Appraise insertion sort and bubble sort for the following numbers in the given order 15, 57, 2, 31, 8, 14 and 17.

Z-Z-Z

END