

UG 2nd Semester Examination, 2026(Reg)

COMPUTER SCIENCE

Full Marks : 100

Time : 3 hours

Answer all questions

The figures in the right-hand margin indicate marks

PART – I

1. Answer *all* questions : 1 × 10

i. Which of the following is a linear data structure ?

- a) Tree
- b) Graph
- ☒ c) Array
- d) Heap

(Turn Over)

(2)

ii. The index of the first element in an array is usually _____.

- ☒ a) 0
- b) 1
- c) -1
- d) Depends on memory

iii. Time complexity of Binary Search in the worst case is _____.

- a) $O(n)$
- ☒ b) $O(\log n)$
- c) $O(n^2)$
- d) $O(1)$

iv. The last node of a singly linked list point to _____.

- a) First node
- b) Itself
- ☒ c) NULL
- d) Previous node

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v. Insertion at the beginning of a linked list requires _____.

- a) $O(n)$ time
- b) $O(\log n)$ time
- ☒ c) $O(1)$ time
- d) $O(n^2)$ time

vi. POP operation removes an element from _____.

- a) Bottom
- b) Middle
- ☒ c) Top
- d) Any position

vii. The postfix expression of $A + B$ is _____.

- a) $+AB$
- ☒ b) $AB+$
- c) $A + B$
- d) $BA +$

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viii. Which queue allows insertion and deletion at both ends ?

- a) Circular Queue
- b) Priority Queue
- ☒ c) Deque
- d) Simple Queue

ix. The topmost node in a tree is called _____.

- a) Leaf
- ☒ b) Root
- c) Parent
- d) Child

x. BFS stands for _____.

- a) Binary First Search
- ☒ b) Breadth First Search
- c) Balanced First Search
- d) Branch First Search

(5)

PART-II

2. Answer *all* questions. The answer should be within 50 words : 2 × 9

- a. What are the different classifications of data structures ?
- b. What is array insertion ?
- c. Define Bubble Sort.
- d. What is a node in a linked list ?
- e. Define Sparse Matrix.
- f. What is the LIFO principle ?
- g. What is an adjacency matrix ?
- h. Define Dequeue operation.
- i. What is a Binary Search Tree (BST) ?

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PART-III

3. Answer any *eight* questions within 250 words : 5 × 8
- a. Explain Selection Sort with algorithm and suitable example.
 - b. Discuss multidimensional arrays and their applications.
 - c. Explain the structure and operations of a doubly linked list with suitable diagrams.
 - d. Describe polynomial representation using linked lists with an example.
 - e. Explain recursion with suitable examples.
 - f. Explain the structure and operation of a deque.

(Continued)

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- g. Discuss various tree terminologies with suitable diagrams.
- h. Compare Binary Tree and Binary Search Tree.
- i. Define a graph and explain graph terminologies.
- j. Compare arrays and linked lists.

PART-IV

4. Answer any *four* questions within 800 words : 8 × 4
- a. Explain Bubble Sort with algorithm, example and complexity analysis.
 - b. Explain the structure and memory representation of a singly linked list. Discuss traversal, insertion and deletion operations with algorithms.

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(Turn Over)

- c. Explain stack representation using arrays and linked lists. Discuss PUSH and POP operations with algorithms.
- d. Define a binary tree and explain its properties with suitable examples.
- e. Discuss real-world applications of graphs in computer science.