



*Sembakk*

# Avinashilingam Institute for Home Science and Higher Education for Women

Deemed to be University Estd. u/s 3 of UGC Act 1956, Category A by MHRD (now MoE)

Re-accredited with A++ Grade by NAAC. CGPA 3.65/4, Category I by UGC

Coimbatore - 641043, Tamil Nadu, India

## Bachelor's Degree Arrear Examination – November 2025 II Semester

Batch : 2024  
Major : Computer Applications

Time : 3 Hours  
Max. Marks : 100

### 23BCAC03 Data Structures

#### Course Outcomes:

- CO1. Identify various types of cyber-attacks, tools used for gathering information about target.
- CO2. Assess different types of cyber criminals and the motives behind them.
- CO3. Realize the exploitations and the malicious codes to be precautious.
- CO4. Analyze the defense techniques suitable for the system.
- CO5. Apply the techniques for securing the systems.

#### Part A

10 x 1 = 10

#### Choose the Correct Answer

1. Which of the following is the best measure for comparing the efficiency of two algorithms? CO1K1
  - a. The number of lines of code
  - b. The time and space complexity
  - c. The programming language used
  - d. The number of comments in the code
2. Omega( $\Omega$ ) notation is used to describe: CO1K2
  - a. The best-case performance
  - b. The worst- case performance
  - c. The average-case performance
  - d. The lower bound of performance
3. Which data structure follows the "First In; First Out" (FIFO) principle? CO2K2
  - a. Stack
  - b. Queue
  - c. Linked list
  - d. Tree
4. Given the infix expression  $A+B*C -D$ , what is the correct postfix expression? CO2K3
  - a.  $A B C^* +D -$
  - b.  $A B C^* D -+$
  - c.  $A +B * CD -$
  - d.  $A B+C^* D -$
5. What is the root node in a tree? CO3K2
  - a. The first node in pre-order traversal
  - b. The last node in post-order traversal
  - c. The topmost node in the tree
  - d. Any leaf node
6. Which of the following is the correct sequence of post-order traversal? CO3K1
  - a. Root→Left→ Right
  - b. Left→Right→Root
  - c. Right →Root→Left
  - d. Left→ Root→Right
7. Which sorting algorithm works best when the data set is almost sorted? CO4K2
  - a. Merge Sort
  - b. Quick Sort
  - c. Insertion Sort
  - d. Selection Sort
8. The data structure used in Binary Search is CO4K3
  - a. Stack
  - b. Queue
  - c. Linked list
  - d. Tree
9. In which type of file organization are records stored one after another in the order they are entered? CO5K3
  - a. Sequential File Organization
  - b. Indexed File Organization
  - c. Direct File Organization
  - d. Hashed File Organization
10. Which file organization method uses a primary key for faster searching? CO5K1
  - a. Sequential File Organization
  - b. Indexed File Organization
  - c. Heap File Organization
  - d. Linked File Organization

**Part B**  
**Answer ALL questions**  
**Each answer should not exceed 400 words or two pages**

**5 x 6 = 30**

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|---|-------|
| 11.a. Explain the concept of ADT in the context of arrays.                              | CO1K1 |
| (or)  |       |
| 11.b. Differentiate between time and space comparison.                                  | CO1K1 |
| 12.a. Explain the process of converting an infix to postfix expression with an example. | CO2K2 |
| (or)  |       |
| 12.b. Explain the concept of recursion and explain how it works using example?          | CO2K1 |
| 13.a. Explain the applications of singly linked lists in real-world scenarios.          | CO3K2 |
| (or)  |       |
| 13.b. Explain the basic concepts of a tree as a data structure.                         | CO3K3 |
| 14.a. What is sorting and searching? Give example.                                      | CO4K1 |
| (or)  |       |
| 14.b. List out the applications of binary and sequential search algorithms.             | CO4K2 |
| 15.a. Write about file organization.  | CO5K1 |
| (or)  |       |
| 15.b. Explain about direct file organization.   | CO5K2 |

**Part C**  
**Answer ALL questions**  
**Each answer should not exceed 800 words or four pages**

**5 x 12 = 60**

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|---|-------|
| 16.a. Discuss about Big Oh, Omega and Theta notations with example                    | CO1K2 |
| (or)  |       |
| 16.b. What is an array? How to represent it? Give example                             | CO1K2 |
| 17.a. Explain the basic operations on a singly linked list with an example.           | CO2K1 |
| (or)  |       |
| 17.b. Explain the basic operations on stack and queue with an example                 | CO2K2 |
| 18.a. Describe in detail the concept of a threaded binary tree with an example.       | CO3K3 |
| (or)  |       |
| 18.b. Describe in detail the concept of a binary tree traversal with an example.      | CO3K3 |
| 19.a. Explain about sequential search with an example.                                | CO4K1 |
| (or)  |       |
| 19.b. Describe in detail about binary search with an example.                         | CO4K2 |
| 20.a. Describe in detail about index sequential file organizations and access method. | CO5K2 |
| (or)  |       |
| 20.b. Describe in detail about hashing.   | CO5K3 |

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