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 Science

Time : 3 Hours
Max. Marks : 100

23BCSC03 Data Structures

Course Outcomes:

CO1. To understand the basic ideas of algorithms and data structures.
CO2. Apply linear and non linear data structures to programming solutions.
CO3. Understand and apply tree and graph structures.
CO4. Ability to choose and implement appropriate data structures in real-time problems.
CO5. Obtain knowledge of advanced data structures.

Part A **10 x 1 =10**

Choose the Correct Answer

1. The time factor when determining the efficiency of algorithm is measured by CO1K1
   a. Counting microseconds
   b. counting the number of key operations
   c. Counting the number of statements
   d. counting the kilobytes of algorithm

2. Which of the following is the advantage of the array data structure? CO1K2
   a. Elements of mixed data types can be stored
   b. Easier to access the elements in an array
   c. Index of the first element starts from 1
   d. Elements of an array cannot be sorted

3. Which one of the following is the process of inserting an element in the stack? CO2K1
   a. Insert b. Add c. Push d. Pop

4. Which of the following is the infix expression? CO2K2
   a. A+B*C b. +A*BC c. ABC+* d. AB+C*

5. The number of edges from the root node to the deepest leaf is called ____of the tree. CO3K1
   a. Height b. Depth c. Length d. Width

6. In which of the following, an edge that starts and ends at the same vertex? CO3K1
   a. Cycle b. Loop c. Order d. Degree

7. What data structure is used in standard implementation of Breadth first search? CO4K1
   a. Stack b. Queue c. Linked List d. Tree

8. Which file organization is primarily concerned with the relationship between the key of the record and its physical location? CO4K3
   a. Sequential b. Direct c. Indexed d. Hierarchical

9. What will be the slot allotted for 23 in the hash table with hash function = key mod 5 andinput elements = {12, 15, 22, 25, 37,23}? CO5K3
   a. 0 b.1 c. 2 d. 3

10. What is a B-tree primarily used for? CO5K1
    a. Sorting elements in an array
    b. Implementing hash tables
    c. Indexing in databases
    d. Storing binary search trees

Part B — 5 x 6 = 30

Answer ALL questions

Each answer should not exceed 400 words or two pages

11.a. Present the characteristics of an algorithm.	CO1K2
(or)	
11.b. How an arrayis represented? Explain it with an example.	CO2K2
12.a. Differentiate between linear and non-linear structure.	CO2K4
(or)	
12.b. Explain the evaluation of postfix expression abc*+ using stack.	CO2K3
13.a. Write on the queue operations with algorithms.	CO2K2
(or)	
13.b. What is threaded binary tree? Explain.	CO3K2
14.a. Write on the adjacent matrix and adjacent list representations of a graph.	CO3K2
(or)	
14.b. What is a balanced tree? Explain with an example.	CO4K2
15.a. Brief on the indexing methods.	CO4K2
(or)	
15.b. What are B-tree properties? Explain.	CO5K2

Part C — 5 x 12 = 60

Answer ALL questions

Each answer should not exceed 800 words or four pages

16.a. Explain the algorithm specification and performance analysis.	CO1K1
(or)	
16.b. Write the algorithm steps and explain the following: i) Traverse an array ii) Search an element in an array	CO2K1
17.a. Discuss the stack data structure operations and its applications.	CO2K2
(or)	
17.b. Explain the algorithmto convert an infix to a postfix expression using stack.	CO2K3
18.a. Discuss the various types of queues with their representations.	CO3K1
(or)	
18.b. Explain the different types of linked list and its operations.	CO3K1
19.a. Present the binary tree traversal methods with example.	CO4K2
(or)	
19.b. Explain briefly about the DFS and BFS graph traversal methods.	CO4K2
20.a. Explain the construction of B+ tree with example.	CO5K2
(or)	
20.b. Elaborate the various hashing techniques in detail.	CO5K2

****