(6 pages)

Reg. No. : .....

Code No.: 10463 E **Sub. Code: CMCS 41**

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2023.

Fourth Semester

Computer Science – Core

DATA STRUCTURES

(For those who joined in July 2021 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL the questions.

Choose the correct answer:

1. When does the Array Index Out Of Bounds Exception occur?
   (a) Compile-time
   (b) Run-time
   (c) Not an error
   (d) Not an exception at all

2. Which data structure is mainly used for implementing the recursive algorithm?
   (a) Queue (b) Stack
   (c) Binary tree (d) Linked liste

3. Process of inserting an element in stack is called _____.
   (a) Create (b) Push
   (c) Evaluation (d) Pop

4. Linked list is considered as an example of _____ type of memory allocation.
   (a) Dynamic (b) Static
   (c) Compile time (d) Heap

5. What is the maximum number of children that a binary tree node can have?
   (a) 0 (b) 1
   (c) 2 (d) 3

6. To obtain a prefix expression, which of the tree traversals is used?
   (a) Level-order traversal
   (b) Pre-order traversal
   (c) Post-order traversal
   (d) In-order traversal

7. What is the number of edges present in a complete graph having n vertices?
   (a) $(n*(n+1))/2$
   (b) $(n*(n-1))/2$
   (c) n
   (d) Information given is insufficient

8. Which of the following statements for a simple graph is correct?
   (a) Every path is a trail
   (b) Every trail is a path
   (c) Every trail is a path as well as every path is a trail
   (d) Path and trail have no relation

9. Which of the following is not a stable sorting algorithm?
   (a) Insertion sort
   (b) Selection sort
   (c) Bubble sort
   (d) Merge sort

10. Quick Sort can be categorized into which of the following?
    (a) Brute Force technique
    (b) Divide and conquer
    (c) Greedy algorithm
    (d) Dynamic programming

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).
Each answer should not exceed 250 words.

11. (a) Discuss about Dynamic Memory Allocation.

    Or

    (b) Discuss uses of Arrays and its types.

12. (a) Define Queue.

    Or

    (b) Mention the Advantages of Doubly Linked List.

13. (a) Explain about Max Heap.

    Or

    (b) Mention the Properties of Binary Tree.

14. (a) Discuss about Graph Representation.

Or

(b) Write short notes on Spanning Tree.

15. (a) Write about the Uses of Sorting and Merging.

Or

(b) Write short notes of Satic Hashing.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b)
Each answer should not exceed 600 words.

16. (a) Write notes on Performance Analysis.

Or

(b) State the Algorithm for Matrix Multiplication.

17. (a) Discuss about Linked Stack and its Operations.

Or

(b) Explain about Sparse Matrix and its Representation.

18. (a) Compare Inorder, Preorder, Postorder Traversal.

Or

(b) Explain – how make an insertion into and Deletion from Binary Search Tree.

19. (a) Compare Depth First Search with Breadth First Search.

Or

(b) Discuss about Prim's Algorithm.

20. (a) Write detail notes on Merge Sorting.

Or

(b) Discuss about Heap Sort.
