

PE-276

(562) M.SC. COMPUTER SCIENCE (SECOND SEMESTER)

EXAMINATION JUNE 2022

Compulsory/Optional

Group-

Paper-

Name of Paper- **Data Structure using C++**

Maximum Marks: 80

Time: 3 Hours]

Note: Answer from Both the Section as Directed. The Figures in the right-hand margin indicate marks.

Section-A

1. Answer the following Objective Type questions:

(a) Which of these is not an application of a linked list?

- (i) To implement file systems
- (ii) For separate chaining in hash-tables
- (iii) To implement non-binary trees
- (iv) Random Access of elements

(b) Process of removing an element from stack is called _____

- (i) Create
- (ii) Push
- (iii) Evaluation
- (iv) Pop

(c) What is the traversal strategy used in the binary tree?

- (i) depth-first traversal
- (ii) breadth-first traversal
- (iii) random traversal
- (iv) Priority traversal

(d) Why to prefer red-black trees over AVL trees?

- (i) Because red-black is more rigidly balanced
- (ii) AVL tree store balance factor in every node which costs space
- (iii) AVL tree fails at scale
- (iv) Red black is more efficient

- (e) When the user tries to delete the element from the empty stack then the condition is said to be a _____
- (i) Underflow (ii) Garbage collection (iii) Overflow (iv) None of the above
- (f) A graph with all vertices having equal degree is known as a _____
- (i) Multi Graph (ii) Regular Graph (iii) Simple Graph (iv) Complete Graph
- (g) A graph having an edge from each vertex to every other vertex is called a _____
- (i) Tightly Connected (ii) Strongly Connected (iii) Weakly Connected (iv) Loosely Connected
- (h) Which data structure is mainly used for implementing the recursive algorithm?
- (i) Queue (ii) Stack (iii) Binary tree (iv) Linked list
- (i) Which one of the following is not the type of the Queue?
- (i) Linear Queue (ii) Circular Queue (iii) Double ended Queue (iv) Single ended Queue
- (j) Heap exhibits the property of a binary tree?
- (i) True (ii) False

Section-B

Unit I

2. Why do we need data structures? How data structures are classified? Explain in detail.

OR

What is Link List? Write the advantages of linked list and describe types of linked lists in detail.

Unit II

3. What is Stack? what are the operations used on stack? Write an algorithm/pseudocode to convert a infix expression to postfix expression?

OR

Write Short notes on:

- (i) Traverse
- (ii) Double Ended Queue
- (iii) Prefix
- (iv) Postfix

Unit III

4. Describe type of Traversal algorithm. Write an iterative algorithm to perform in order traversal of a binary tree.

OR

What is a Binary Search Tree (BST)? Show the structure of the binary search tree after adding each of the following values in that order: 10, 25, 2, 4, 7, 13, 11, 22. What is the height of the created binary search tree?

Unit IV

5. Write Short notes on:

- (i) Hashing
- (ii) Binary Search
- (iii) Linear Search
- (iv) Sequential Search

OR

Describe types of shorting. Write an algorithm to perform bubble sort on a collection of 'n' numbers.

Unit V

6. Differentiate between BFS and DFS also Write algorithms for DFS and BFS traversal on a graph.

OR

Write Short notes on:

- (i) DFS
- (ii) Graph
- (iii) Spanning Tree
- (iv) Weighted Graph