

B.C.A. (Part-III) EXAMINATION, 2023 (Faculty of Science) (Three-Year scheme of 10+2+3 Pattern) Paper - 301/331

DATA STRUCTURE (Using C/C++)

Time Allowed: Three Hours

Maximum Marks - 100

- **PART-I:** (Very short answer) consists of 10 questions of 2 marks each. Maximum limit for each questions is up to 40 words.
- **PART-II:** (Short answer) consists of 5 questions of 4 marks each. Maximum limit of each question is up to 80 words.
- **PART-III:** (Long answer) consists of 5 questions of 12 marks each with internal choice.

PART-I

1.

2.

(i) Give any two applications of Stack.

[2*10=20]

- (ii) Differentiate between Stack and Queues.
- (iii) What are circular linked list?
- (iv) What are the different types of Polish Notations?
- (v) What do you understand by Binary Search Tree?
- (vi) What are the applications of Binary Trees?
- (vii) Define Graph data structure.
- (viii) Mention full forms of BFS and DFS.
- (ix) Give average and worst time complexities of bubble sort and merge sort.
- (x) What is sequential Searching?

PART-II

- [4*5=20]
- (i) What are data structures? Explain different types of data structures.
- (ii) Write differences between Arrays and Linked Lists.

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- (iii) What are tree traversal? Explain.
- (iv) Explain different ways of graph representation.
- (v) Discuss the concept of binary search.

PART-III

1. What are arrays? How do we create arrays in C/C++? Explain in detail. [4+8]

OR

What are stacks? Explain different operations available in stack data structure. Also discuss implementation of stack as an array. [4+4+4]

2. What is a linked list data structure? What are the application of it? Describe different types of linked list in brief. [4+4+4]

OR

Write a code in C/C++ to create a singly linked list and perform the following operations.

(a) Insert Node.	
(b) Delete Node.	[6+6]
Explain the following terms associate with trees.	[12*1]
(a) Node	

- (b) Child Node.
- (c) Leaf Node.
- (d) Parent Node.
- (e) Root.

3.

- (f) Edge.
- (g) Height of the Node.
- (h) Depth of the Node.

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- (i) Degree of Node.
- (j) Subtree.
- (**k**) Neighbours of a Node.
- (1) Sibling.

OR

What are Binary Trees? Explain any four operations that can be performed on Binary Trees. [4+8]

4. Explain various types of Graphs. Also explain any two operations on Graphs.

[8+4]

OR

Discuss the following:

- (a) All-Pairs shortest path.
- (b) Transitive closure of a Graph.
- 5. What is searching? Write an algorithm for sequential search. Also write code for sequential search in C/C++. [12]

OR

Discuss the concept of bubble sort. Write and algorithm and a code in C/C++ for bubble sort. [4+8]



[6+6]