

1541
B.C.A. (Part-III) Examination – 2024
(Faculty of Science)
(Three-Year Scheme of 10+2+3 Pattern)
Paper-301/331 DS
Data Structure (Using C/C++)

Time Allowed: Three Hours

Maximum Marks: 100

Answer of all the questions (Short answer as well as descriptive) are to be given in the main answer-book only. Answers of short answer type questions must be given in sequential order. Similarly all the parts of one question of descriptive part should be answered at one place in the answer-book. One complete question should not be answered at different places in the answer-book.

Write your roll number on question paper before start writing answers of questions.

Question paper consists of three parts. All three parts are compulsory.

PART - I : *(Very short answer) consists of 10 questions of 2 marks each. Maximum limit for each question is up to 40 words.*

PART - II : *(Short answer) consists of 5 questions of 4 marks each. Maximum limit for each question is up to 80 words.*

PART - III : *(Long answer) consists of 5 questions of 12 marks each with one question from each unit with internal choice.*

PART-I

1. Very Short Answer -

[10×2=20]

- (a) What is the need for an algorithm?
- (b) Mention any two application areas of queue.
- (c) How will you represent a linked list in a graphical view?
- (d) What is the main advantage of a linked list?
- (e) Differentiate between root node and leaf node?
- (f) Briefly explain the concept of tree traversal.
- (g) Differentiate between directed and undirected graph?
- (h) What is transitive closure in reference to a graph structure?
- (i) Which sorting algorithm has the best time complexity and why?
- (j) What is the purpose of searching?

PART-II

[5×4=20]

2. Short Answer -

- Discuss the characteristics of an algorithm.
- Explain operations of a stack using linked list with an example.
- Explain insertion and deletion operation on a binary search tree with the help of an example.
- Differentiate between Depth First Search and Breadth First Search with suitable examples.
- Explain the working of merge sort on the following data -
12 31 25 8 32 17 40 42

PART-III

3. Give a detailed explanation of implementation of two-dimensional array with all the operations using C/C++. Also discuss its operations.

[7+5=12]

OR

Discuss in detail the following operation on a circular queue using array -

[3+3+3+3=12]

- enQueue()
 - deQueue()
 - isFull()
 - isEmpty()
4. Write a code for insertion of a node in doubly linked list in the following position (using C/C++) -
- At the beginning (Start)
 - In between two Existing Nodes (Middle)
 - At the End

[4+4+4=12]

OR

Write short notes on the following -

[4+4+4=12]

- Application areas of Linked List
 - Linked List versus Arrays
 - Traversing a Linked List
5. What is the use of a binary tree? Given the following inorder and preorder traversal reconstruct a binary tree -

[2+10=12]

Inorder - D, G, B, E, A, F, I, C

Preorder - A, B, D, E, H, C, F, I