

V
(21225)
BCA-III Sem.

(Printed Pages 4)
Roll No.

18012

B.C.A. Examination, Dec.-2025

Data Structure Using C and C++

(BCA-302)

Time : Three Hours] [Maximum Marks : 75

Note : Attempt questions from **all** the sections as per instructions.

Section-A

(Very Short Answer Type Questions)

Note : Attempt all the **five** questions. Each question carry 3 marks. Very short answer is required not exceeding 75 words. $5 \times 3 = 15$

1. What is sparse matrix and why to use sparse matrix instead of simple matrix?
2. How does binary search differ from linear search.

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3. What is the role of polish notation in arithmetic expression evaluation?
4. Explain circularly linked list.
5. Explain complete binary tree with example.

Section-B

(Short Answer Type Questions)

Note : Attempt any **two** questions out of the following three questions. Each question carries $7\frac{1}{2}$ marks. Short answer is required not exceeding 200 words. $2 \times 7.5 = 15$

6. If the in order traversal of a binary tree is B, I, D, A, C, G, E, H, F and its postorder traversal is I, D, B, G, C, H, F, E, A. Determine the binary tree.
7. Write the procedure to find maximum and minimum element from an array.
8. Covert the following infix expression into postfix expression:
 $A*(B+D)/E-F*(G+H/K)$

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Section-C

(Detailed Answer Type Questions)

Note : Attempt any **three** questions out of the following five questions. Each question carries 15 marks. Answer is required in detail. $3 \times 15 = 45$

9. Consider a multidimensional array A[90][30][40] with base address starts at 1000. Calculate the address of A[10][20][30] in a row major order and column major order. Assume the first element is stored at A[2][2][2] and each element take 2 byte.
10. What do you mean by traversal of binary tree. Give the recursive algorithm for various types of binary tree traversal with suitable example.
11. Write an algorithm to delete the k^{th} node from a two-way linked list. Explain the algorithm by taking an example.
12. Explain any three commonly used hash function with the suitable example? A hash function H defined as : $H(\text{key}) = \text{key} \% 7$, with linear probing is used to insert the key 37, 38, 72, 48, 98, 11, 66 into a table indexed from 0 to 6. What will be the location of key 11? Justify your answer, also count the total number of collisions in this probing.
13. Explain the following:
- (a) Priority queues
 - (b) Merge Sort
 - (c) Applications of binary search tree

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