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(20525) Roll No. .....

B.Sc. (Hon's.) Com.Sci.-II Sem.

NS-3286

B.Sc. (Honours) Computer Science

Examination, May-2025

Data Structure Using C and C++

(BHCS-201)

Time : Three Hours] *[Maximum Marks : 75*

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

Section-A

(Very Short Answer Questions)

Note : Attempt **all five** questions. Each question carries 3 marks. Very Short Answer is required not exceeding 75 words. 5×3=15

1. If the Tower of Hanoi is Operated on n=10 disks. Calculate the total number of moves.

P.T.O.

2. Explain the application of sparse matrices.

3. Translate infix expression into its equivalent postfix expression :

   A* (B+D)/E – F * (G+H/K)

4. Define 'AVL' Tree or Height Balanced True.

5. Classify the hashing functions based on the various method by which the key values is found.

Section-B

(Short Answer Questions)

Note : Attempt any **two** questions out of the following three questions. Each question carries 7.5 marks. Short Answer is required not exceeding 200 words.

$2 \times 7.5 = 15$

6. Construct AVL free from the following modes : B, C, G, E, F, D, A.

7. Draw a binary tree which following traversal :

Inorder : D B H E A I F J C G

Preorder : A B D E H C F I J G

8. Explain Djikastra's algorithm with suitable example.

Section-C

(Detailed Answer Questions)

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

9. What are single linked lists? Write a C program to create doubly linked list.

10. Define a B-Tree. What are the applications of B-Tree? Draw B-Tree of Order 4 by insertion of the following keys in Order :

Z, U, A, I, W, L, P, X, C, J, D, M, T, B, Q, E, H, S, K, N, R, G, Y, F, O, V .

11. Write an algorithm for merge sorting using the algorithm sort in according order :

    10, 25, 16, 5, 25, 48, 8

12. Write short notes on any three:

    (i) Insertion sort

    (ii) Heap Sort

    (iii) Stack

    (iv) Circular Queue

13. Define Spanning tree. Find the minimal spanning tree for the following graph using Prim's algorithm