

BA, BSC, BCOM, BCA DEGREE END SEMESTER EXAMINATION - OCTOBER 2025**UGP (HONS.) SEMESTER - 3: DISCIPLINE SPECIFIC COURSE****COURSE: 24UCAPDSC201/24UBCADCC202: DATA STRUCTURES USING C++***(For Regular 2024 Admission)*

Time: 1.5 Hour

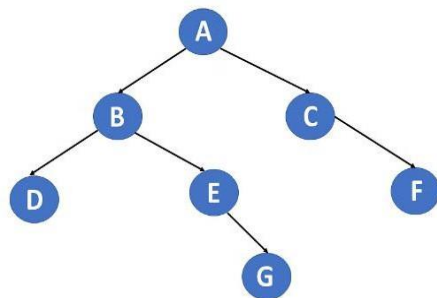
Max. Mark: 50

PART- A***(Answer any 5 questions. Each question carries 2 marks)***

1. Define a data structure and give suitable examples. (U, CO1)
2. Determine the time complexity of the following code snippet using Big-O notation: (A, CO1)
void printPairs(int arr[], int n) {
 for(int i = 0; i < n; i++) {
 for(int j = 0; j < n; j++) {
 cout << arr[i] << " " << arr[j] << endl;
 }
 }
}
3. Differentiate between linear search and binary search. (A, CO2)
4. Evaluate the postfix expression : 2 8 + 9 6 - / (A, CO3)
5. Illustrate the concept of double ended queue with an example. (A, CO4)
6. Draw a binary tree and identify root, internal nodes , leaf nodes and height. (A, CO4)
7. List some real-world applications of graphs. (U, CO4)

(2 x 5 =10)**PART- B*****Answer any 4 questions. Each question carries 5 marks***

8. Describe the different types of arrays and explain their memory representation with example. (U, CO1)
9. Discuss the recursive algorithm for performing Binary Search. (A, CO2)
10. Write the algorithms for push and pop operations in a stack. (A, CO3)
11. Illustrate the algorithm for deletion (dequeue operation) in a circular queue with a suitable example. (U, CO3)
12. Describe the procedure for inserting a node at the beginning of a singly linked list. (U, CO4)
13. Perform In -order, Pre-order and Post- order traversals on the given tree and write the sequence of nodes visited. (U, CO4)



(5 x 4 = 20)

PART- C*(Answer any 2 questions. Each question carries 10 marks)*

14. Explain the Quick Sort algorithm with a suitable example and trace the steps for sorting the array [8, 3, 1, 7, 0, 10, 2] (A, CO2)
15. Discuss any two applications of a stack in detail with suitable examples. (A, CO3)
16. Explain the concept of a Binary Search Tree (BST). Describe insertion and deletion operations in a BST with suitable examples. (A, CO4)

(10 x 2 = 20)

OBE: Questions to Course Outcome Mapping

CO	Course Outcome Description	CL	Questions	Total Marks
CO1	Explain the classification of data structures and analyze the time and space complexity of algorithms.	U	1,2,8	9
CO2	Analyze various searching and sorting techniques with respect to their efficiency and use cases.	A	3,9,14	17
CO3	Implement stack and queue data structures using arrays and demonstrate their applications.	A	4,5,10,11,15	24
CO4	Construct linked lists, trees, and graphs and perform relevant operations on them.	A	6,7,12,13,16	24

Cognitive Level (CL): Cr - CREATE; E - EVALUATE; An - ANALYZE; A - APPLY; U - UNDERSTAND; R - REMEMBER
