



C20-CM-WD-CAI-304

**7237**

**BOARD DIPLOMA EXAMINATION, (C-20)**

**OCTOBER/NOVEMBER—2024**

**DCME - THIRD SEMESTER EXAMINATION**

**DATA STRUCTURES THROUGH C**

*Time : 3 Hours ]*

*[ Total Marks : 80*

---

**PART—A**

3×10=30

- Instructions :** (1) Answer **all** questions.  
(2) Each question carries **three** marks.  
(3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. Define a data structure.
2. Define the term 'time complexity' in data structure.
3. Define the terms Stack, PUSH and POP.
4. List any two 'nonlinear data structures' and any two linear data structures.
5. Write the syntax of malloc () in dynamic memory allocation.
6. Write the rules for queue overflow and underflow conditions.
7. Construct equivalent notations of prefix  $2*4+5*7$ .
8. List the advantages of linked list over arrays.
9. List the differences between general tree and binary tree.
10. Define binary search tree.

**PART—B**

8×5=40

- Instructions :** (1) Answer **all** questions.  
(2) Each question carries **eight** marks.  
(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

**11.** (a) Use the concept of an array to write a program for bubbler sort.

**(OR)**

(b) Write a C program for binary search.

**12.** (a) Write a program to create a double linked list.

**(OR)**

(b) Write a program to perform search and replace an element in a single linked list.

**13.** (a) Write a program for stacks using linked list.

**(OR)**

(b) Explain how to convert in-fix expression to post-fix expression.

**14.** (a) Explain all the operations of circular queues.

**(OR)**

(b) Write a C program to implement to queues using single linked list.

**15.** (a) Explain the linear and linked list representations of a binary tree.

**(OR)**

(b) Construct a Binary tree for the given nodes and perform in order, preorder and post order traversals.

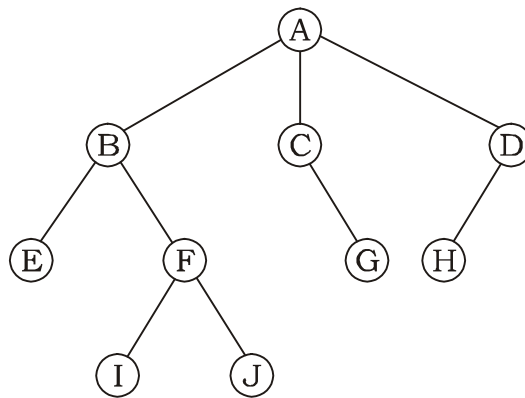
10, 20, 34, 56, 78, 9, 99, 223

**PART—C**

10×1=10

- Instructions :** (1) Answer the following question.  
(2) The question carries **ten** marks.  
(3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

**16.** Construct a binary from the following general tree :



★★★