7237

BOARD DIPLOMA EXAMINATION, (C-20)

OCTOBER/NOVEMBER—2023

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. What is abstract data type? List any two abstract data types.

2. Define the terms linear data structure and non-linear data structure.

3. Define sorting. List any two sorting techniques along with their time complexity.

4. List the differences between array and linked list.

5. Draw the node structure of a doubly linked list. Write the equivalent C structure to represent the node of a doubly linked list.

6. Define queue. List the applications of queues.

7. What is stack overflow and stack underflow?

8. List the different types of expression representations along with an example.

9. Define the terms edge, internal nodes and path.

10. Define tree traversal. List various tree traversal techniques.

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)* Write a C function to implement quick sort.

(OR)

(b) Write an algorithm to sort the given elements in ascending order using bubble sort.

12. *(a)* Write a C function to insert an element into a singly linked list.

(OR)

(b) Write a C program to create a doubly linked list with N elements.

13. *(a)* Write a C program to implement stack data structure using array.

(OR)

(b) Write the procedure to convert the following infix expression to postfix notation :

$$(A + B * C) + (D - E) * F / H$$

14. *(a)* Write a C program to implement queue using linked list.

(OR)

(b) Write a C program to implement circular queue using an array.

15. *(a)* Explain how to convert a general tree to binary tree with an example.

(OR)

(b) Explain in detail about an array and a linked list representation of binary tree.

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. Write a C program to implement two stacks from two ends of an array.

★★★