C16-CM-IT–**304**

6230

BOARD DIPLOMA EXAMINATION, (C-16)

JANUARY/FEBRUARY—2022

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 an ADT? List any two of abstract data types.

2.   What is non linear data structure? List any two non linear data structures.

3.   Write a C self referential structure to represent a node in doubly linked list.

4.   List the applications of stack data structure.

5.   Draw the structure of a singly circular linked list.

6.   Write the required C statements to print the first node of a singly linked list.

7.   Define binary tree.

8. What is tree traversal? List various tree traversal techniques.

9. List the sorting techniques which uses divide and conquer technique.

10. List any three differences between linear and binary search techniques.

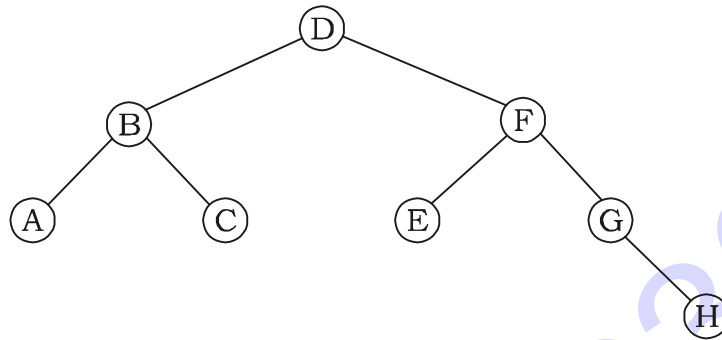## PART—B

Instructions : (1) Answer *any* **five** questions.

(2) Each question carries **ten** marks.

(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

11. *(a)* Compare and contrast arrays, linked list. 5

(b) Write a C function to create a singly linked list. 5

12. *(a)* Evaluate the postfix expression 23 + 4 – 5 * 2 /. 5

(b) Write down the push and pop functions when the stack is implemented using array. 5

13. What is queue? Write a C program to implement Queue data structure using array. 10

14. *(a)* Write a C function to convert the given infix expression to postfix notation. 5

(b) Write a C function to search and replace an element in the singly linked list. 5

15. *(a)* Write a C function to insert a node into the binary search tree. 5

(b) Create a binary search tree with the following traversals. 5

Inorder : A B C D E F G H

Postorder : D B A C F E G H

16. Write down the algorithms for various tree traversal techniques of a binary tree and also find the tree traversals for the following binary tree. 10

17. Write a C program to sort the given elements using merge sort. 10

18. *(a)* Write an algorithm to sort the given elements using insertion sort. 5

(b) Write an algorithm to search for an element using binary search. 5

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