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C16-CM-IT-304

6230

BOARD DIPLOMA EXAMINATION, (C-16)

JUNE/JULY—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 abstract data types.
2. List various linear data structures.
3. Draw the structure of a circular doubly linked list.
4. Write a C self-referential structure to represent a node in singly circular linked list.
5. List the applications of Queue data structure.
6. Write the required statements to print the last node of a circular doubly linked list.
7. Write a C self-referential structure to represent a node of a binary tree.
8. List the applications of trees.
9. What is sorting? List various sorting techniques.
10. Write down the time complexities of various searching techniques.

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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 singly linked list and doubly linked list. 5
(b) Write a C function to count the number of nodes present in the circular doubly linked list. 5
12. Write a C function to insert a node into the singly linked list. 10
13. What is stack? Write a C program to implement stack using linked list. 10
14. Explain how to convert infix to postfix expression with an example. 10
15. What is a binary tree? Explain in detail about linear and linked list representation of a binary tree. 10
16. (a) Explain how to convert the general tree to binary tree with an example. 5
(b) Write down the recursive functions for various tree traversals of a binary tree. 5
17. Write a C program to sort the given elements using quick sort. 10
18. (a) Write an algorithm to merge the given two sorted lists. 5
(b) Write an algorithm for searching an element using sequential search. 5

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