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C20-CM-WD-CAI-304

7237

BOARD DIPLOMA EXAMINATION, (C-20)

FEBRUARY/MARCH — 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. Define the term 'abstract data type (ADT)'.
2. Classify any three user defined data structures.
3. Define the terms searching and sorting.
4. State the purpose of dummy header in a linked list.
5. Give the representation of a sample node structure for a doubly linked list.
6. Give the definition and any two applications of stack.
7. Define the terms PUSH and POP.
8. What is a priority queue?
9. Give any three differences between binary tree and general tree.
10. Assume a binary tree with any six alphabets as it's nodes and give its post order traversal.

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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) Apply the BubbleSort technique on {34, 15, 67, 54, 92 and 89} elements and show the output of each iteration.

(OR)

- (b) Make use of the concept of recursion to write a C program for Binary search.

12. (a) Construct a double linked list with 5 nodes and perform delete and display operations.

(OR)

- (b) Use linear search technique to write a C program to find an element over a linked list.

13. (a) Build an equivalent postfix expression for the given infix expression $((2*3)+5*8)/7*9$.

(OR)

- (b) Use stack to evaluate the given postfix expression "2 37* + 4-".

14. (a) Explain how to perform all the circular queue operations using arrays.

(OR)

- (b) Use linked list to write a c program to create an ordinary queue and to implement insert and delete operations.

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15. (a) Construct a Binary tree for the given nodes (10, 20, 33, 55, 66, 99, 39 and 44) and find out root node, leaf nodes, height of the tree and internal nodes.

(OR)

- (b) Construct a binary tree with the following nodes. Find out in order, pre order and post order traversals :

4 2 5 1 3 16 89 90 121 34 67

PART—C

10×1=10

Instructions : (1) Answer the following question.

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

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

16. Use LIFO data structure to process 10 elements (10, 30, 20, 40, 50, 60, 80, 90, 78 and 99) and show the status of stack for operations push, push, push, pop, pop, push, push, push, push, pop and 7 consecutive pushes. Will there be any overflow or underflow situation arises? Find out the remaining elements in the stack and justify your answer.

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