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C14–CM–305/C14–IT–305

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BOARD DIPLOMA EXAMINATION, (C–14)

OCT/NOV—2016

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) Answer should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Explain nonlinear data structures. 3

2. Define time and space complexities. 1½+1½=3

3. State the purpose of header node in circular linked list. 3

4. Write a C self-referential structure for a node of a circular doubly linked list. 3

5. What is prefix expression? Give an example. 2+1=3

6. What is circular queue? 3

7. Define the following terms of a tree : 1×3=3

(a) Sibling node

(b) Parent node

(c) Leaf node

8. Explain about preorder traversal of a binary tree. 3

9. State the need of sorting. 3

10. List the types of searching. 1½+1½=3

PART—B

10×5=50

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

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

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

11. Formulate an algorithm which appends (concatenates) a linear list to another linear list. 10

12. Given a double linked list whose typical node consists of an INFO, previous link field and next link field. Formulate an algorithm which will count the number of nodes in the double linked list. 10

13. Design a method for keeping two stacks within a linear array S[SPACESIZE] so that neither stack overflow until all of memory is used and an entire stack is never shifted to a different location within the array. Write C routines push1, push2, pop1 and pop2 to manipulate the two stacks. (*Hint* : The two stacks grow towards each other) 10

14. Explain about queue data structure and its operations. 6+4=10

15. Explain the linear representation and linked list representation of a binary tree. 5+5=10

16. Create binary tree and find the postorder traversal from the following inorder and preorder traversals of the binary tree : 10

Inorder : BCDEAIJGHF

Preorder : ABCDEFGIJH

17. Write a C program to implement bubble sort method. 10

18. *(a)* Write a C program to implement selection sort method. 5

(b) Modify the binary search algorithm so that in the case of an unsuccessful search it returns the index [i] such that K[i]<Key<K[i+1]. If Key<K[0], it returns –1 and Key>K[n –1], it returns n –1 (n is total number of elements). 5

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