2023

DATA STRUCTURE AND ALGORITHM

Paper : BCA–HC–3026

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

Answer *any six* questions :

1. (a) Briefly explain memory representation of 2 D arrays. Write address translation functions for 2D arrays. 5

   (b) Each element of an array DATA [10] [15] requires 4 bytes of storage. Base address of DATA is 4000. Determine the location of DATA [7] [11] when the array is stored as (i) row major, (ii) column major order. 5

2. *(a)* What is linked list? Differentiate between circular and non-circular singly linked lists.   5

(b) What is double linked list? Write algorithms/functions to insert a node in a doubly linked list whose key elements are in ascending order.   5

3. *(a)* What are PUSH and POP operations of stack? Explain the overflow and underflow conditions of stack.   5

(b) What is circular queue? Write an algorithm to insert and delete elements from a circular queue.   5

4. What is binary search tree? Write algorithms/functions to insert and delete nodes from a binary search tree.   10

Or

Describe the concept of binary search technique with suitable example.

5. What is a quicksort? Give its algorithm. Use the algorithm to sort the list of numbers: 6, 4, 2, 9, 1, 7, 3, 5

2+4+4=10

6. Write **any two** tree traversal algorithms (non-recursive).   5×2=10

7. Write notes on : **(any two)**   5×2=10

(a) Asymptotic Analysis of an Algorithm

(b) Threaded Tree

(c) Complexity of Algorithm

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