[Total No. of Questions - 9] [Total No. of Printed Pages - 2]
(2126)

16085(D)

B. Tech 3rd Semester Examination

Data Structures (CBS)

CS-301

Time : 3 Hours **Max. Marks : 60**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all selecting one question from the sections A, B, C and D. Section E is compulsory. All questions carry 12 marks.

SECTION - A

1. What is Big O notation? Prove the transitivity of Big O notation. Also show that nlogn-2n + 13=Ω. (nlogn). (12)

2. Consider 2D array A with subscript limit as $-2 \leq i \leq 5$, $3 \leq j \leq 7$. If the base address of A is 1532 and each item takes two bytes of memory, then find the address of A(4,4) in row major and column major representation. (12)

SECTION - B

3. How a linked list can be used to represent a polynomial in memory? On the basis of the representation write an algorithm to add two polynomials. (12)

4. How a priority queue can be represented using a matrix? Discuss insertion and deletion in this representation. Also write algorithm. (12)

SECTION - C

5. What is a Binary Search Tree? What is its advantage? Write an algorithm to insert an item in a Binary Search Tree. (12)

6. Derive a recurrence for the minimum number of nodes in an AVL tree, as a function of the tree height. (12)

SECTION - D

7. Write an algorithm or a C program to merge sort an array. Also derive the complexity of the algorithm. (12)

8. Classify the Hashing Functions based on the various methods by which the key value is found. Discuss the characteristics of each with example. (12)

SECTION - E

9. Fill in the blanks:

   (i) Access formula for row major access of the elements of a two dimensional array is _____.

   (ii) Insertion in an array is conducive if it is inserted at_____.

   (iii) For any two functions g(n) and f(n),f(n) =Θ(g(n)) iff_____.

   (iv) A Linked list is the better choice for_____operations.

   (v) 2D matrix can be used to implement_____queue.

   (vi) A Tower of Hanoi problem with 8 disks performs _____ moves.

   (vii) In-order traversal of a Binary Search Tree gives the list in _____ order.

   (viii) If A S P F Y T U Z C is post-order traversal of a tree then _____is the root.

   (ix) _____ data structure is used in Breadth First Search of graphs.

   (x) Complexity of Binary Search is _____.

   (xi) The worst case complexity of Quick sort is_____.

   (xii) Chaining is a technique to resolve_____in hashing. (12×1=12)