

Roll No. ....

**2006**

**B. E. 3rd Semester (ECE)**

**Examination – December, 2009**

**DATA STRUCTURE & ALGORITHM**

**Paper : CSE-201-E**

***Time : Three hours ]***

***[ Maximum Marks : 100***

*Before answering the question, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions. All questions carry equal marks.

1. (a) What do you mean by the term Data Structure? Discuss the basic operations of data structures with examples. 10
- (b) What is a two dimensional array ? Describe the formula for calculating the address of any element of a two dimensional array. 10
2. (a) What is circular queue ? Discuss its advantages over linear queue ? 10
- (b) What do you understand by Dynamic memory management ? Create a circular link list using

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dynamic memory and show its advantages over linear linked list. 10

3. (a) What do mean by Stack? Define with the help of algorithms for its operations e.g. PUSH and POP. Describe a method to convert an infix expression in to a postfix expression with the help of example. 12
- (b) What do you mean by searching? Discuss and compare various search methods. 8
4. (a) Write an algorithm of complexity  $O(n)$  to find the  $K^{\text{th}}$  smallest element in an array  $\text{num}(n)$ , where  $n$  and  $k$  are given as input. 8
- (b) What is meant by height balance tree? Show insert and delete operation on it. 12
5. Propose a data structure that supports a special operation for finding smallest or largest element in  $O(1)$  time. Prove for such data structure the insert operation must take  $O(\log_2 n)$  time. 20
6. (a) Write merge sort algorithm and derive the expression for its run time complexity in best, average and worst case. 12
- (b) What is threaded binary tree ? Discuss with the help of examples. 8
7. (a) What is graph ? How it can be stored in memory ? Explain BFT and DFT with the help of suitable examples. 12
- (b) What is hashing ? What is the condition for collision ? How collision can be resolved ? 8

8. Write Short notes on any two of the following : 20

- (i) Doubly linked list
- (ii) Asymptotic notations (Big O,  $\Theta$  etc..)
- (iii) Priority Queues

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