IMCA – 14

I Semester Int.M.C.A. Examination, February/March 2010
DATA STRUCTURE

Time : 3 Hours Max. Marks : 100

Instructions: *1) Answer **all** questions in Part – **A**, **5** out of 8 questions in Part – **B**, and **4** out of 6 questions in Part – **C**.*
*2) PART – **A**: Questions from **1** to **8** carry **1** mark **each** and **9** to **14** carry **2** marks **each**.*
*3) PART – **B**: Each question carries **8** marks.*
*4) PART – **C**: Each question carries **10** marks.*

PART – A

Answer **all** Questions and **each** question carries **1** mark. **20**

1. Define data structure.
2. Define algorithm.
3. Mention important attributes in analyzing algorithms.
4. Mention basic operations performed on stacks.
5. What is the importance of header node in linked list.
6. What is the time complexity of linear search.
7. What is a hash function.
8. A problem can be solved by two algorithms A1 and A2. If algorithm A1 has time complexity of the order O (log n) and A2 has the time complexity of the order O (n!), name the best algorithm for the problem.

Answer **all** Questions and **each** question carries **2** marks.

9. Explain best and average case time complexities.
10. What is a recurrence relation.
11. Differentiate between recursion and iteration.
12. Explain construction of Heap.
13. What are the advantages of hashing.
14. Differentiate between Binary Tree and Binary Search Tree.

P.T.O.

PART – B

Answer **any 5** questions. **Each** question carries **8** marks. **(5×8=40)**

1. Write algorithms to implement queues using linked lists.

2. What is dynamic memory allocation? Explain various functions that support dynamic memory allocation in "C".

3. a) Explain the concept of Interpolation search.

   b) Write algorithm to convert an infix expression to postfix expression.

4. Explain various tree traversal techniques.

5. Explain the heap sort technique through algorithms.

6. Differentiate between Ordinary Queue and Circular Queue. Write algorithms to insert and delete an element from Circular Queue.

7. Write algorithm to evaluate post fix expression and illustrate the same through example.

8. Construct binary search tree for the following data:
   96,12,45, 36, 25,9,85, 52, 14,10, 24.

PART – C

Answer **any 4** questions. **Each** Question carries **10** marks. **(10×4=40)**

1. What are asymptotic notations. Explain various asymptotic notations.

2. Write algorithms for the following techniques: a) Selection Sort b) Insertion Sort

3. Explain various ways by which you can resolve hash collisions.

4. Write algorithms to insert and delete an element in the doubly linked list at a given position and explain with examples.

5. Apply Merge sort technique to sort the following: 52, 45, 12, 36, 85, 48, 32, 10,8.

6. Explain the following techniques: a) Linear search b) Binary search.

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