Code No: X1221 $\boxed{\textbf{R07}}$ $\boxed{\text{SET - 1}}$

II B. Tech I Semester, Supplementary Examinations, Nov – 2012
ADVANCED DATA STRUCTURES AND ALGORITHMS

(Information Technology)

Time: 3 hours   Max. Marks: 80

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Illustrate about class, objects and class members with an example.

    b) What is Constructor? With an example C++ Program, describe the importance of Constructor.

2. a) Describe function overloading and write a C++ program to implement function overloading

    b) Describe about runtime polymorphism using mutual function

3. a) What is the space complexity of a recursive function *int fact(int a)*?

    b) What is ADT? Briefly describe sparse matrix representation

4. a) What is hashing? Briefly describe about hashing with chains.

    b) Compare and contrast linear probing Vs quadratic probing techniques.

5. a) What are different ways of representing priority queue(s) and briefly describe them.

    b) Describe about heap sort techniques and give its applications

6. a) Briefly describe Red-Black Trees and their imbalances.

    b) Define AVL tree and discuss about finding height of an AVL tree.

7. a) Briefly describe divide and conquer technique.

    With an example, briefly describe algorithm for binary search

    b) Elucidate about control abstraction algorithm for divide and conquer method

8. a) What is Greedy method? With an algorithm, briefly describe 0/1 Knapsack problem.

    b) Formulate equations for 0/1 Knap-sack problem using dynamic programming.

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Code No: X1221 $\left(\text{R07}\right)$ $\left(\text{SET - 2}\right)$

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Time: 3 hours   Max. Marks: 80

Answer any **FIVE** Questions
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1. a) What is inline function? Write a C++ Program to implement inline functions.

    b) Define class and object explain about class scope in delay in detail.

2. a) Briefly describe operator overloading. Write a C++ program to implement operator overloading

    b) Define inheritance explain different types of inheritance with examples.

3. a) Write a C++ program to add two sparse matrices.

    b) Briefly describe queue ADT? And describe about its operations

4. a) Briefly describe how to perform insertion operation using double hashing for the list: 12, 54, 62, 45, 37, 78, 89, 29, 64, 48

    b) Briefly describe quadratic probing.

5. What is the significance of external sorting? With an example, briefly describe how to perform external sorting on multiway merge.

6. a) What are splay trees? Briefly describe splay tree operations with suitable examples.

    b) Give comparison of search Trees

7. a) Briefly describe strassen's matrix multiplication

    b) Briefly describe Quick sort algorithm with an example

8. a) With an algorithm, describe job sequencing with deadlines.

    b) Describe about ordering matrix multiplication.

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Code No: X1221   **R07**   SET - 3

II B. Tech I Semester, Supplementary Examinations, Nov – 2012
ADVANCED DATA STRUCTURES AND ALGORITHMS

(Information Technology)

Time: 3 hours   Max. Marks: 80

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) What is Class Template? Briefly describe inheritance.

   b) Write a C++ program to implement class template.

2. a) What are class members and access control?

   b) Describe in detail about generic programming

3. a) Write an algorithm to insert an element into a queue using linked list.

   b) Explain different notations used to represent time complexity and space complexity.

4. a) What is skip list? With an example, briefly describe insertion, deletion and searching operations on skip list(s).

   b) Describe different collision resolution techniques.

5. What is an external sorting? With an example, briefly describe how to perform external sorting on polyphase merge.

6. What are AVL Trees? Briefly describe algorithms for four types of imbalances in AVL trees

7. a) Briefly describe disjoint set operations. Describe algorithms for union and find operation in sets

   b) Explain about strassens matrix multiplications

8. a) What are minimum cost spanning trees? Briefly describe prim's algorithm

   b) Briefly describe krushkal's algorithm.

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Code No: X1221   **R07**   **SET - 4**

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Time: 3 hours   Max. Marks: 80

Answer any **FIVE** Questions
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1. a) What is *this* pointer? Briefly describe static members.

   b) With an example program, briefly describe constructor and parameter passing mechanism.

2. a) Briefly describe abstract classes with an example.

   b) Write a C++ program to demonstrate runtime polymorphism using virtual function

3. a) What is an algorithm? Briefly describe the properties of an algorithm. Briefly describe time complexity and space complexity

   b) Implement stack ADT using template classes in C++

4. a) Write a C++ program to implement dictionary with hashing.

   b) Briefly describe skip list along with their operations

5. a) What is Priority queue? Briefly describe the implementation of priority queues using heaps.

   b) Describe about heap sort and trace with an example.

6. What is an AVL Tree? Write a C++ program to implement binary search trees

7. a) Briefly describe bi-connected components

   b) Write an algorithm for strassen's matrix multiplication. Calculate time complexity compare this with conventional matrix multiplication.

8. a) What are OBST? With an algorithm, briefly describe OBST.

   b) Explain about general method for greedy method.

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