1. Explain the following terms: (30%)
   a. Data Mining
   b. Supply Chain Management
   c. ER Model
   d. XML
   e. eBusiness
   f. Web Service

2. What is "Object-Oriented Modeling"? (10%) Use Object-Oriented Modeling technique to model the following text. (15%).

   A robotic cell has machines (M1, M2 etc.) of different types and robots (R1, R2, etc.) for transferring parts form one machine to another. Each machine has its own input queue (Q1, Q2 etc). A robot unloads parts form a machine and transfer them to the input queue of another machine. Assume the robot is much faster than the machines so that no output queue is necessary for the machines.

3. Compute the minimum height and maximum height of a binary tree with N nodes. (10%)

4. Write a Bubble Sort algorithm to sort an array of N items of data into an ascending order. (10%)

5. What is "Recursive Program"? (10%) List the computing steps of the following program and its result. (15%)

```
Mail ( )
  {printf("fib(4) = %d", fib(4));}
fib (int n)
  {int x, y;
    if (n <= 1) return (n);
    x = fib (n-2);
    y = fib(n-1);
    return (x + y);}
```

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