(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2706 Roll No. | | | | | | | | | | |

B.Tech.

(SEM. VII) ODD SEMESTER THEORY EXAMINATION 2012–13

OBJECT ORIENTED SYSTEMS AND C++

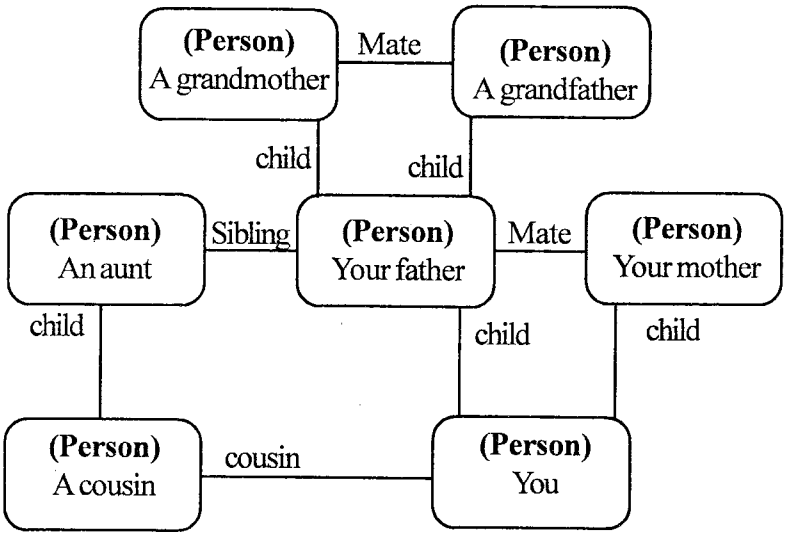
Time : 3 Hours *Total Marks : 100*

Note :– (i) Attempt **all** questions.

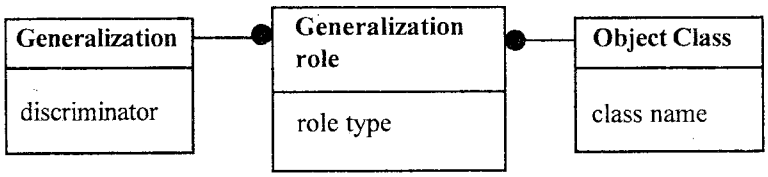
(ii) Program/functions should be written in C++ only.

1. Attempt any **two** parts : **(10×2=20)**

(a) Prepare a class Diagram from the following Instance Diagram.



(b) Following portions of a meta model describes a generalization. A generalization is associated with a Several generalization roles. Which are the roles that object classes play in generalization relationships ? Role type is either sub class or superclass. Does this model support multiple inheritances ? Explain your answer.



(c) Explain the following terms with examples :
   (i) Dynamic Model
   (ii) Aggregation
   (iii) Data flow Diagram.

2. Attempt any **two** parts : **(10×2=20)**
   (a) Discuss the various features of OMT.
   (b) Prepare a Data flow Diagram for Computing the volume and surface area of a cylinder. Inputs are the height and radius of the cylinder, outputs are Volume and surface area. Discuss several ways of implementing the Data flow Diagram.
   (c) Write Scenarios for the following Activities :
      (i) Getting ready to take a trip in your car. Assuming an automatic transmission. Don't forget your seat belt and Emergency brake.
      (ii) An Elevator ride to the top floor.

3. Attempt any **two** parts : **(10×2=20)**
   (a) What are the differences between a friend function for a class and a member function of a class ? Explain with the help of a example.

(b) Given the class definition, and you are the class author :

```
class A
{
public :
A();
A(int);
int f () const;
int g( const A & x);
private :
int i;
};
```

Give code to

(i) overload the + operator as a member function.

(ii) overload the + operator as a friend function

(c) **Write a Circle class that has the following member variables :**

•radius: a double

•pi: a double initialized with the value 3.14159

The class should have the following member functions :

•**Default Constructor**. A default constructor that sets radius to 0.0.

•**Constructor**. Accepts the radius of the circle as an argument.

•**setRadius**. A mutator function for the radius variable.

•**getRadius**. An accessor function for the radius variable.

•**get Area.** Returns the area of the circle, which is calculated as area = pi * radius * radius

•**getDiameter.** Returns the diameter of the circle, which is calculated as diameter = radius * 2

getCircumference. Returns the circumference of the circle, which is calculated as circumference = 2 * pi * radius

Write a program that demonstrates the Circle class by asking the user for the circle's radius, creating a Circle object, and then reporting the circle's area, diameter, and circumference.

4. Attempt any **two** parts : **(10×2=20)**

   (a) Write a function that dynamically allocates an array of integers. The function should accept an integer argument indicating the number of elements to allocate. The function should return a pointer to the array.

   (b) Write a program in C++ that lets the user enter 10 values into an array. The program should then display the largest and smallest values stored in the array.

   (c) Write a function named coin Toss that simulates the tossing of an coin. When you call the function, it should generate a random number in the range of 1 through 2. If the random number is 1, the function should display "heads." If the random number is 2, the function should display "tails." Demonstrate the function in a program that asks the user how many times the coin should be tossed, and then simulates the tossing of the coin that number of times.

5. Write short notes any **two** of the following : **(10×2=20)**

   (a) Operator Overloading in C++

   (b) Dynamic Models

   (c) Virtual functions in C++.