1. Create a base class called Shape with a virtual function area(). Derive two classes Rectangleand Circle from the base class. Implement the area() function for each class.

A.

```
abstract class Shape {
    // Abstract method area() (no method body)
    public abstract double area();
}
class Rectangle extends Shape {
    private double length;
    private double width;
    public Rectangle(double length, double width) {
        this.length = length;
        this.width = width;
    }
    public double area() {
        return length * width;
    }
}
class Circle extends Shape {
    private double radius;
    public Circle(double radius) {
        this.radius = radius;
    }
    public double area() {
        return Math.PI * radius * radius;
    }
}
public class ShapeTest {
    public static void main(String[] args) {
        Rectangle rect = new Rectangle(5.0, 3.0);
        Circle circle = new Circle(2.5);
```

```
        System.out.println("Area of Rectangle: " + rect.area());
        System.out.println("Area of Circle: " + circle.area());
    }
}
```

2. Create a base class called Animal with a virtual function speak(). Derive two classes Cat andDog from the base class. Implement the speak() function for each class.

A.

```
class Animal {
    public void speak() {
        System.out.println("Animal speaks");
    }
}
class Cat extends Animal {
    public void speak() {
        System.out.println("Meow!");
    }
}
class Dog extends Animal {
    public void speak() {
        System.out.println("Woof!");
    }
}
public class AnimalTest {
    public static void main(String[] args) {

        Cat cat = new Cat();
        Dog dog = new Dog();
        cat.speak();
        dog.speak();
    }
}
```

3. Create a base class called Employee with a virtual function calculatePay(). Derive two classesManager and Engineer from the base class. Implement the calculatePay() function for each class.

A.

```
class Employee {
    public void calculatePay() {
        System.out.println("Calculating pay for Employee");
    }
}
class Manager extends Employee {
   ride calculatePay() method for Manager
    public void calculatePay() {
        System.out.println("Calculating salary for Manager");


    }
}
class Engineer extends Employee {
    public void calculatePay() {
        System.out.println("Calculating salary for Engineer");
    }
}
public class EmployeeTest {
    public static void main(String[] args) {
        Manager manager = new Manager();
        Engineer engineer = new Engineer();
        manager.calculatePay();
        engineer.calculatePay();
    }
}
```