Obj1		Obj2		Obj3		Obj4	
	40		15		17		33

CENG 1004 MIDTERM EXAM

Name

1) What would be the output of the following code? (5 Pts.) (Objective - 1)

```
int a = 5;
int b = a++;
int c = ++a;
int d = a++ + b-- + c++;

System.out.println("a= " + a + ", b= " + b +  ", c= " + c +  ", d= " + d);
```

2) Complete the body of the following method to return maximum of the given parameters (5 Pts.) (Objective - 1)

```
public static int max(int a, int b) {









}
```

3) What would be the output of the following code? (10 pts.) (Objective - 1)

```
for (int i = 1; i <= 5; i++){
      for (int j = 1; j <= 5; j++)
          if ((i == j) ||  (i + j == 6)){
          System.out.print("X");
          }else{
          System.out.print("_");
          }
      System.out.println("");
}
```

4) Complete the code between the given statements so that the for loop will print the first 50 prime numbers. (15 Pts.) (Objective - 1)

```
int[] primeNumbers = new int[50];
```

```
for(int i=0; i< 50; i++){
    System.out.print(primeNumbers[i] + " ");
```

Name

5) What would be the output if you run the following class? (5 Pts.) (Objective - 1)

```
public class QuestionC {

    int a;

    public static void main(String[] args) {
        QuestionC c= new QuestionC();
        c.a = 5;

        int a = 10;

        increment(c, a);

        System.out.println("c.a = " + c.a + ", a = " + a);
    }

    public static void increment(QuestionC c, int a){
        c.a++;
        a++;

    }
}
```

6) What would be the return value of the below function for function(6)? (5 Pts) (Objective - 2)

```
    public static int function(int n)  {
        if(n == 0)
            return 0;
        else if(n == 1)
          return 1;
       else
          return  function(n - 1) + 2 * function(n - 2);
    }
```

7) Hexadecimal (base 16) uses sixteen distinct symbols, the symbols 0–9 to represent values zero to nine, and A, B, C, D, E, F to represent values ten to fifteen. For example decimal number 175 corresponds to AF in hexadecimal. Write a recursive function "String hexa(int n)" which returns hexadecimal representation of an integer. (10 Pts) (Objective - 2)

8) How many objects are created if you run the following Class? (5 Pts) (Objective - 3)

```
public class QuestionB {
    int num;

    public static void main(String[] args) {
        QuestionB b = new QuestionB();
        b.num = 5;

        QuestionB c = b;
        c.num =4;

        Object obj = c;

        QuestionB d = new QuestionB();
        d.num = b.num;
    }
}
```

Name

9) Consider the following class definition (12 Pts) (Objective - 3)

```
public class Test {

    String aaa;
    public int iii;
    private String ccc;
    protected double ddd;

    protected Test() {

    }

    protected boolean methodA() {
        return true;
    }

    public void methodB() {

    }

    double methodC() {
        return 0.0;
    }

    private int methodD(int days) {
        return 0;
    }

}
```

A. Which members(fields, constructor, methods) are visible to (accessible from) the subclasses of Test located in different packages?

B. Which members are visible to (accessible from) only the Test class?

C. Which members are visible to (accessible from) any class?

D. Which field(s) should we write getter(s) and setter(s) for, so the subclasses in different packages can access it(them)?

10) What is the name of the class that is the ancestor to every other class in Java? Give two method names that are inherited by all classes from this class (8 pts.) (Objective - 4)

11) Consider the following class: (25 Pts) (Objective - 4)

```
import java.util.ArrayList;

public class TestAnimals {

    public static void main(String[] args) {
        ArrayList<Animal> animals = new ArrayList<>();

        Cat cat = new Cat("Tom");
        animals.add(cat);

        Dog dog = new Dog("Scooby Doo");
        animals.add(dog);

        Duck duck = new Duck("Donald");
        animals.add(duck);

        //print names of animals
        for(Animal animal: animals){
            System.out.print(animal.getName() + ", ");
        }
        // Output: Tom, Scooby Doo, Donald,


        //print sounds of animals
        for(Animal animal: animals){
            System.out.print(animal.speak() + ", ");
        }
        // Output: Meow, Woof, Quack,

    }

}
```

11 - A) Which class(es) and method(s) can be defined abstract? (5 Pts)

11 - B) What is the name of the polymorphic variable used in this code? (5 Pts)

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11 - C) Write the implementation of the Animal and Cat classes? (15 Pts)