Name: _____ Reg #: _____ Section: _____

National University of Computer and Emerging Sciences, Lahore Campus

Course:	Advanced Programming	Course Code:	CS433
Program:	BS(Computer Science)	Semester:	Fall 2018
Duration:	60 Minutes	Total Marks:	23
Paper Date:	03-Oct-18	Weight	15 %
Section:	ALL	Page(s):	6
Exam:	Mid-I		

Instruction/Notes: Attempt the examination on the question paper and write concise answers. You can use extra sheet for rough work. Do not attach extra sheets used for rough with the question paper. Don't fill the table titled Questions/Marks.

Question	Objective	1	2	3	4	Total
Marks	/9	/3	/2	/4	/5	/23

Section 1 (Objective part) [points 9]

Clearly circle the correct options.

Q1. Method Overriding is an example of?

(A) static binding (B) dynamic binding (C) runtime polymorphism (D) compile-time polymorphism

Q2. Suppose a BaseClass has variables with different access modifiers (default, public, protected and private). If SubClass is in different package as BaseClass, which variables of the BaseClass will be accessible in the SubClass?

(A) public only (B) private, public, default (C) public, protected (D) public, default, protected

Q3. What will be the output?

```
class MyClass {
    int i = 0;
    public MyClass() {
      i = i+2;
    }
    public static void main(String args[]) {
            MyClass obj = new MyClass();
            System.out.print("The value of i  is "+ this.i);
    }
}
```

Ans:

Compile time error

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Q4. What is the output of the following program?

```
class Test
{
    public static void main(String args[])
    {
        int i;
        System.out.println(i);
    }
}
```

A. A value of 0 will be printed out.
B. Nothing will be printed out.
C. A compile time error.
D. None of the above.

Q5. The code below gives the error. Explain the reason for error and also specify if it is compile time error or runtime error.

```
interface AirCond
{
    public default void off() { System.out.println("Going to switch off"); }
    void on();
}

class House implements AirCond
{
    void on()
    {
        System.out.println("Going to switch on");
    }
    public static void main(String args[]) {
        Y obj = new Y();
        obj.methodX();
    }
}
```

Ans: In class house while overriding void on
→ these should be public with void. It would be compile time error.
→ no implementation of class Y is given. so initialization implementing Y would also cause error.

Q6. Encircle the true statement(s).

(A) An interface cannot extend a class.
(B) An interface cannot extend multiple interfaces.
(C) A class cannot partially implement an interface.
(D) You can create references of interface type.

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Q7. What will be the output of the following program?

```
class Catch {
  public static void main(String args[]) {
    try {
      int x = 0;
      int e = 11 / x;
    } catch(Exception e) {
      System.out.println("Gotcha.");
    } catch(ArithmeticException e) {
      System.out.println("Caught.");
    }
  }
}
```

Ans:

Compile time error.

Q8. What will be the value of c?

```
String str1 = "message";

char c = str1.charAt(7);
```

(A) e (B) null (C) runtime error (D) compile time error

Q9. What is the output of the following program?

```
public class Test
{
      public static void main(String args[])
      {
            String str = null;
            if(str.length() == 0) {
             System.out.println("1");
            } else if(str.length() == null) {
             System.out.println("2");
            } else {
             System.out.println("3");
            }
      }
}
```

Ans:

← Compile time error.

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Section 2 (Subjective part) (marks 15)

Question No. 1 [3 Marks]

What is difference between String, StringBuffer and StringBuilder class? When to use what?

Solution:

String
- immutable
- not thread safe

StringBuilder
- mutable
- not thread safe

StringBuffer
- mutable
- thread safe

Question No. 2 [2 Marks] Given the following two java classes in two separate files, write the answers for the two parts (a & b) given below:

```
import examples.A;
package examples;

public class A {
        int a;
        protected int j;

        void print() {
        }
        private void calculate() {
        }
        protected void execute() {
        }


}
```

```
package samples;

class B extends A {
      private int i;
      private void print() { }

      public static void main(String args[]){
        B obj = new B();
      }
}
```

(A) Fix the compile time errors in the code. (Don't try to change the name of the packages of these two classes) import example.* or example to A here

(B) Which of the data members and methods will be accessible by an object of B?

Ans: j & execute() will be accessible by an object of B.

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Question No. 3 [3 + 1 points]

Write the output of the following program? Moreover how much memory will be allocated for **empID** and **count** for the two created Employee objects.

```
public class  Employee{
   int empID;
   static int count;
   static int temp = method(count);

   Employee() {  count++; }

   {
      System.out.print(", Block count: ");
   }

   static { System.out.println("AT THE END"); }

   {
      count++;
      System.out.print(count);
   }

   static { System.out.println("In Static Block"); }

   static int method(int count) {
            System.out.println("Inside method");
            return count+20;
   }

   public static void main(String args[]) {
      Employee emp1 = new Employee ();
      emp1. count = 70;
      Employee emp2 = new Employee ();
      emp2.count = temp;
      Employee emp3 = new Employee ();
      System.out.println("\nTemp: "+temp);
   }
}
```

Output: (Note: take care of new lines)

Inside method.
AT THE END.
In Static Block.
Block count 1Block count 71Block
count 21
Temp: 20.

Total Memory for empID?

4+4 bytes = 8 bytes.

Total memory for count?

4 Bytes

Question No. 4 [1 + 4 points]

a) What is difference between an Abstract class and an Interface? **(1 mark)**

Solution:

Abstract class	Interface
- Some methods abstract & some have implementation	- All methods abstract.
- (1 - 100%) abstraction	- can have default or static implemented method.
	- Used to resolve diamond problem

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b) Keeping in mind the concepts of an Abstract class and an Interface, correct the following programs. (4 marks)

public class Animal {
boolean legs;
public abstract void sound();
public void method2 () { }
}
	public interface NonFlying {
	void movement();
	
	void getName() { };
	}

public class Cat extends Animal, Thread{
// here Thread is also a class
String name;
 	
public void sound(){
System.out.println("Meow");
}
}
	public class Cat implements NonFlying {
	
	}

Solution:

```
Public abstract class Animal{
    boolean legs;
    public abstract void sound();
    public void method2(){}
}
```

```
public class cat extend Animal{
    String name;
    public void sound(){
        System.out.println("Meow");
    }
}
```

```
public Interface NonFlying
{
    void movement();
    void getName();
}

public class cat
implements NonFlying{
public void movement()
{
}
public void getName()
{
}
```