Q1.

a. Which of these array declarations are not legal? Select two correct answers. **(3)**

(a) int[] i[] = { { 1, 2 }, { 1 }, {}, { 1, 2, 3 } };

(b) int i[] = new int[2] {1, 2};

(c) int i[][] = new int[][] { {1, 2, 3}, {4, 5, 6} };

(d) int i[][] = { { 1, 2 }, new int[2] };

(e) int i[4] = { 1, 2, 3, 4 };

b. Given the class: **(2)**

```
// File name: Args.java
public class Args {
      public static void main(String[] args) {
          System.out.println(args[0] + " " + args[args.length-1]);
          }
}
```

What would be the result of executing the following command line?

➢ ***java Args In politics stupidity is not a handicap***

c. *Which will be the output of following program:* **(5)**

```
public class MyClass {
    public static void main(String[] args) {
        try {
            f();
        } catch (InterruptedException e) {
            System.out.println("1");
            throw new RuntimeException();
        } catch (RuntimeException e) {
            System.out.println("2");
            return;
        } catch (Exception e) {
            System.out.println("3");
        } finally {
            System.out.println("4");
        }
        System.out.println("5");
    }
    static void f() throws InterruptedException {
        throw new InterruptedException("Time for lunch.");
    }
```

d. What will be the result of attempting to compile and run the following class? (2)

```
public class IfTest {
      public static void main(String[] args) {
            if (true)
                  if (false)
                        System.out.println("a");
                  else
                        System.out.println("b");

      }
}
```

e. What will be result of compiling and running the following program: (3)

```
  // Filename: MyClass.java
public class MyClass {
      public static void main(String[] args) {
            C c = new C();
            System.out.println(c.max(13, 29));
      }
}
class A {
      int max(int x, int y) { if (x>y) return x; else return y;
}
}
class B extends A{
      int max(int x, int y) { return super.max(y, x) - 10; }
}
class C extends B {
      int max(int x, int y) { return super.max(x+10, y+10); }
}
```

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Q2.

a. Explain three object oriented principals? Given that Thing is a class, how many objects and how many reference variables are created by the following code? (5)

2 3

```
Thing item, stuff,data;
item = new Thing();
Thing entity = new Thing();
```

b. How automatic garbage collector works in Java? Write the usage of finalize method? (5)

```
// Filename: MyClass.java
public class MyClass {
        public static void main(String[] args) {
                B b = new B("Test");
        }
}
class A {
        A() { this("1", "2"); }
        A(String s, String t) { this(s + t); }
        A(String s) { System.out.println(s); }
}
class B extends A {
        B(String s) { System.out.println(s); }
        B(String s, String t) { this(t + s + "3"); }
        B() { super("4"); };
}
```

Q3.

a. Explain Dynamic Method Dispatch? Which of the following three method declarations are correct? **(5)**

```
(a) void compute(int... is) { }
(b) void compute(int is...) { }
(c) void compute(int... is, int i, String... ss) { }
(d) void compute(String... ds) { }
(e) void compute(String... ss, int len) { }
(f) void compute(char[] ca, int... is) { }
```

b. Write the properties of abstract classes? Explain with example two uses of super keyword in inheritance? **(5)**

c. Differentiate between overloading and overriding. Provide the output of following program? **(5)**

```
public class Polymorphism {
      public static void main(String[] args) {
            A ref1 = new C();
            B ref2 = (B) ref1;
            System.out.println(ref2.f());
      }
}
class A { int f() { return 0; } }
class B extends A { int f() { return 1; } }
class C extends B { int f() { return 2; } }
```

PTO

Q4. (5)

a. Complete the following Class member access table:

	Private	No Modifier	Protected	Public
Same class				
Same package subclass				
Same package non-subclass				
Different package subclass				
Different package non-subclass				

b. What are interfaces? Write the advantages of adding default method in interfaces? (5)

c. Differentiate between throw and throws with example? Briefly explain multi-catch feature in exception handling? (5)

Q5.

a. What are threads and write the ways of creating threads in Java? Draw threads state transition diagram? (5)

b. What are Deadlocks in multi-thread programming? Explain with example? (5)

c. What are race conditions? How synchronization is implemented in Java? (5)

Q6.

a. Explain Automatic resource management feature with example? (5)

b. Provide the output of following program: (5)

```
class A {
      int i, j;}
class B {
      int i, j;}
class C extends A {
      int k;}
class D extends A {
      int k;}
class InstanceOf {
      public static void main(String args[]) {
            A a = new A();
            B b = new B();
            C c = new C();
            if(a instanceof A)
                  System.out.println("a is instance of A");
            if(b instanceof B)
                  System.out.println("b is instance of B");
            if(c instanceof A)
                  System.out.println("c can be cast to A");
            if(a instanceof Object)
                  System.out.println("a may be cast to Object");}}
```

c. Define following: (5)

i. Java virtual machine.

ii. Volatile keyword.

iii. Transient keyword.