

Roll No.....

M.Sc (Informatics) II Sem.-2016
Paper-IT-24, Programming Languages

Time: 3hrs

Maximum Marks:75

(Write your Roll No. on the top immediately on receipt of this question paper)

(Answer Question 1 Compulsory and any 4 from the rest)

Q1.

(3+3+3+3+3)

- A) Thing is a class, how many objects and how many reference variables are created by the following code?

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

- B) What will be written to the standard output when the following program is run?

```
public class STR {
    public static void main(String args[]) {
        String word = "restructure";
        System.out.println(word.substring(2, 8));
    }
}
```

- C) Given the following directory structure:

```
/proj
|--- lib
|    |--- supercharge.jar
|
|--- src
|--- top
|--- sub
|--- A.java
```

Assume that the current directory is /proj/src, and that the class A declared in the file A.java uses reference types from the JAR file supercharge.jar.

Which commands will succeed without compile-time errors?
 Select the two correct answers.

- (a) javac -cp ../lib top/sub/A.java
- (b) javac -cp ../lib/supercharge top/sub/A.java
- (c) javac -cp ../lib/supercharge.jar top/sub/A.java
- (d) javac -cp /proj/lib/supercharge.jar top/sub/A.java
- (e) javac -cp /proj/lib top/sub/A.java

- D) Which one of following array declaration statements is not legal?

Select the one correct answer.

- (a) int []a[] = new int [4][4];
- (b) int a[][] = new int [4][4];
- (c) int a[][] = new int [][4];
- (d) int []a[] = new int [4][];
- (e) int [][]a = new int [4][4];

- E) Which of these method declarations are valid declarations of the main() method that would be called by the JVM in order to start the execution of a JAVA application?

Select the three correct answers.

- (a) static void main(String[] args) { /* ... */ }
- ☒ (b) public static int main(String[] args) { /* ... */ }
- (c) public static void main(String args) { /* ... */ }
- (d) final public static void main(String[] arguments) { /* ... */ }
- (e) public int main(Strings[] args, int argc) { /* ... */ }
- (f) static public void main(String args[]) { /* ... */ }
- (g) static public void main(String... args) { /* ... */ }

Q2.

(2+2+2+5+2+2)

- A. What is Java Byte code and where it is stored? Explain the series of steps involved in compiling and running any Java Program?
- B. Given the class Args.java, what would be the result of executing the following command line?
 >java Args In politics stupidity is not a handicap

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

- C. What will be the result of compiling and running the following program?

```
public class Init {
    String title;
    boolean published;
    static int total;
    static double maxPrice;
    public static void main(String[] args) {
        Init initMe = new Init();
        double price;
        if (true)
            price = 100.00;
        System.out.println("|" + initMe.title + "|" + initMe.published + "|" +
            Init.total + "|" + Init.maxPrice + "|" + price + "|");
    }
}
```

- D. Briefly explain three Object oriented programming principals? How these three principals work together? Give example.
- E. Why JAVA is called as Strongly Typed Language?
- F. Given a class named Book, which of following constructor declarations are not valid for the class Book?

- ☒ (a) Book(Book b) {}
- ☒ (b) Book Book() {}
- (c) private final Book() {}
- (d) void Book() {}
- (e) public static void Book(String[] args) {}
- ☒ (f) abstract Book() {}

Q3.

(3+3+3+4+2)

- A. What is Automatic Garbage Collection? What is significance of finalize() method?
- B. Explain Static block in Java? What are the various restrictions imposed on static methods?
- C. How Java supports Variable-arity methods internally? Explain with example how ambiguity arises while using varargs methods?

- D. What is Method overloading? Give an example of overloaded constructors. Following two methods are overloaded or not:

```
void fn(){
    System.out.println("in f()");
}
final static void fn(int i){
    System.out.println("in final static fn(int i)");
}
```

- E. Write the usage of transient and volatile modifiers?

Q4.

(3+3+3+3+3)

- A. What is Dynamic Method Dispatch? Write its usage with example?

- B. Write the two usage of super keyword?

- C. Complete the following Access protection table with YES or NO:

	Private	No Modifier	Protected	Public
Same Class				
Same Package Sub class				
Same Package Non-sub class				
Different Package Sub class				
Different Package Non-Sub class				

- D. What are Interfaces?

- Does an interface inherit another interface?
- Is Nested interfaces supported in Java?
- Whether following interface definition is correct or not?

```
public interface InterfaceA {
    void saySomething();

    default void sayHi() {
        System.out.println("Hi");
    }
}
```

- E. What will the following program print when run?

```
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"); };
}
```

Q5.

(2+4+3+4+2)

- A. Differentiate between final and finally keywords with example?
- B. What are Threads? How threads can be created in JAVA? What are benefits and challenges of using threads in applications?

- C. Draw the Thread State transition diagram?
- D. What is race condition in multi-threaded applications? Under what conditions deadlocks are generated in applications? Explain with example.
- E. Which digits, and in what order, will be printed when the following program will run?

```
public class MyClass {
    public static void main(String[] args) {
        int k=0;
        try {
            int i = 5/k;
        } catch (ArithmeticException e) {
            System.out.println("1");
        } catch (RuntimeException e) {
            System.out.println("2");
            return;
        } catch (Exception e) {
            System.out.println("3");
        } finally {
            System.out.println("4");
        }
        System.out.println("5");
    }
}
```

Select the one correct answer.

- (a) The program will only print 5.
 (b) The program will only print 1 and 4, in that order.
 (c) The program will only print 1, 2, and 4, in that order.
 (d) The program will only print 1, 4, and 5, in that order.

Q6

(2+2+3+3+3+2)

- A. JDK7 introduces Automatic Resource Management (ARM). What is this ARM? Give example.
- B. JAVA Strings are called as Immutable? What does it mean?
- C. Name the type of I/O streams supported in JAVA. Name I/O class of each stream. Which type of I/O stream should be used for web based applications?
- D. Elaborate the significance of following line of code in JAVA:
 BufferedReader br = new
 BufferedReader(new InputStreamReader(System.in));
- E. What is static import in java? Given the following code, which statement when insert at (1), will result the program to print Hello World.

```
// (1) INSERT ONE IMPORT STATEMENT HERE
public class RQ700_20 {
    public static void main(String[] args) {
        out.println("Hello World");
    }
}
```

- F. What will be the result of attempting to compile and run the following class?

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