M.Sc. (Informatics) – II Semester - 2015

IT-24 Programming Languages

Time: 3 Hrs. **Max. Marks: 75**

Note: Q1 is Compulsory.

Attempt any 4 questions from Q2 to Q6.

1 (3+3+3+3+3)

I. Which one of the following array declaration statements is not legal?
Select the one correct answer.

(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 };

II. Which method declarations are valid declarations:
Select the three correct answers.

(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) { }

III. What will be written to the standard output when the following program is run?

```
public class Qd803 {
        public static void main(String[] args) {
                String word = "restructure";
                System.out.println(word.substring(2, 3));
        }
}
```

IV. What will be the result of attempting to run the following program?

```
public class Qaa75 {
        public static void main(String[] args) {
                String[][][] arr = {
                                { {}, null },
                                { { "1", "2" }, { "1", null, "3" } },
                                {},
                                { { "1", null } }
                };
                System.out.println(arr.length + arr[1][2].length);
        }
}
```

Select the one correct answer.
(a) The program will terminate with an ArrayIndexOutOfBoundsException.
(b) The program will terminate with a NullPointerException.
(c) 4 will be written to standard output.
(d) 6 will be written to standard output.

V Which operators will always evaluate all the operands?
Select the two correct answers.
(a) ||
(b) +
(c) &&
(d) ? :
(e) %

2. (5+4+4+2)

I. Write the usage of **instanceof** operator? Provide the output of following program?

```
class Light { /* ... */ }
class LightBulb extends Light { /* ... */ }
class SpotLightBulb extends LightBulb { /* ... */ }
class TubeLight extends Light { /* ... */ }
class NeonLight extends TubeLight { /* ... */ }

public class WhoAmI {
        public static void main(String[] args) {
                boolean result1, result2, result3, result4, result5;
                Light light1 = new LightBulb();
                result2 = light1 instanceof TubeLight;
                result3 = light1 instanceof SpotLightBulb;
                light1 = new NeonLight();
                result4=light1 instanceof TubeLight;
                System.out.println(result2 + " " +  result3 + " " +result4);
        }
}
```

II. Briefly describe various streams used for I/O in JAVA? Explain following snippet of code:

```
BufferedReader br = new BufferedReader(new InputStreamReader(System.in));
```

III. What is static import in java? Given the following code. Which statements, when inserted at (1), will result in a program that prints 7, when compiled and run?

```
// (1) INSERT ONE IMPORT STATEMENT HERE
public class RQ700_20 {
        public static void main(String[] args) {
                System.out.println(sqrt(49));
        }
}
```

IV. Write the usage of assert keyword with example?

Q3 (4+3+3+3+2)

I. Briefly explain all six different thread states? Also draw thread state transition diagram?

II. What is Inter-thread communication? Briefly explain the methods used to achieve inter-thread communication in JAVA?

III. What are Deadlocks? Give example program having Deadlock condition?

IV. Write the difference between throw and throws keyword in Java with example?

V. Select the two correct answers.
(a) The class Thread is abstract.
(b) The class Thread implements Runnable.
(c) The Runnable interface has a single method named start.
(d) Calling the method run() on an object implementing Runnable will create a new thread.
(e) A program terminates when the last user thread finishes.

Q4 (2+3+2+3+3+2)

I. Write the use of final keyword when applied to class, method and variable?

II. What are Abstract classes? Write all the properties of abstract classes.

III. Which one of the following class declarations is a valid declaration of a class that cannot be extended? Select one correct answer.
(a) class Link { }
(b) abstract class Link { }
(c) native class Link { }
(d) static class Link { }
(e) final class Link { }
(f) private class Link { }
(g) abstract final class Link { }

IV. What is Dynamic Method Dispatch? Describe with example program.

V. Write the two uses of super keyword in inheritance?

VI. What is automatic garbage collection?

Q5 (2+3+5+5)

I. Briefly describe why JAVA is architecture neutral programming language?

II. How no-modifier, protected and public class member access modifier provide access control:
- In same package class, sub-class and non-subclass.
- Different package class, sub-class and non-subclass.

III. What are interfaces? Briefly provide answer of following question along with example:
a) Interface can be nested or not?
b) Advantage of using default static method in interface?

IV. Explain all the principals of OOP? Describe with example how all the OOP works together?

Q6 (2+3+5+2+3)

I. Why JAVA is called as strongly typed language?

II. What are the restrictions applied to static methods? What is the use of static block?

III. Briefly describe Automatic Resource Management with example?

IV. WAP to iterate three dimension array using for each loop?

V. What are JAVA Applets? How Applets supports security in JAVA?