

## A10.1-R4: INTRODUCTION TO OBJECT ORIENTED PROGRAMMING THROUGH JAVA

### NOTE:

1. There are **TWO PARTS** in this Module/Paper. **PART ONE** contains **FOUR** questions and **PART TWO** contains **FIVE** questions.
2. **PART ONE** is to be answered in the **OMR ANSWER SHEET** only, supplied with the question paper, as per the instructions contained therein. **PART ONE** is **NOT** to be answered in the answer book.
3. Maximum time allotted for **PART ONE** is **ONE HOUR**. Answer book for **PART TWO** will be supplied at the table when the answer sheet for **PART ONE** is returned. However, candidates, who complete **PART ONE** earlier than one hour, can collect the answer book for **PART TWO** immediately after handing over the answer sheet for **PART ONE**.

**TOTAL TIME: 3 HOURS**

**TOTAL MARKS: 100**  
**(PART ONE – 40; PART TWO – 60)**

### **PART ONE** **(Answer all the questions)**

1. **Each question below gives a multiple choice of answers. Choose the most appropriate one and enter in the “OMR” answer sheet supplied with the question paper, following instructions therein. (1x10)**
  - 1.1 Which of the following is possible in a class if class is declared as an abstract?
    - A) Instance block
    - B) Static block
    - C) Final method
    - D) All of the above
  - 1.2 How do objects communicate during execution?
    - A) They communicate by modifying each other's fields.
    - B) They communicate by modifying the static variables of each other's classes.
    - C) They communicate by calling each other's instance methods.
    - D) They communicate by calling static methods of each other's classes.
  - 1.3 What is the default encoding for output stream writer?
    - A) UTF-8
    - B) UNICODE
    - C) 8859\_1
    - D) The default is System-dependent
  - 1.4 Which of these array declaration statements are not legal?
    - 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 ] };`
  - 1.5 Given the following code within a method, which statement is true?  
`int a, b;`  
`b = 5;`
    - A) Local variable a is not declared.
    - B) Local variable b is not declared.
    - C) Local variable a is declared but not initialized.
    - D) Local variable b is initialized but not declared.

1.6 What will be the result of compiling the following program?

```
public class MyClass {  
    long var;  
    public void MyClass(long param) { var = param; } // (1)  
    public static void main(String[] args) {  
        MyClass a, b;  
        a = new MyClass(); // (2)  
        b = new MyClass(5); // (3)  
    }  
}
```

- A) A compilation error will occur at (1), since constructors cannot specify a return value.
- B) A compilation error will occur at (2), since the class does not have a default constructor.
- C) A compilation error will occur at (3), since the class does not have a constructor that takes one argument of type int.
- D) The program will compile without errors.

1.7 Which one of the following class declarations is a valid declaration of a class that cannot be extended?

- A) class Link { }
- B) abstract class Link { }
- C) static class Link { }
- D) final class Link { }

1.8 What is the result of running the following program?

```
public class OperandOrder {  
    public static void main(String[] args) {  
        int i = 0;  
        int[] a = {3,6};  
        a[i] = i = 9;  
        System.out.println(i + " " + a[0] + " " + a[1]);  
    }  
}
```

- A) When run, the program throws an exception of type `ArrayIndexOutOfBoundsException`.
- B) When run, the program will print "9 9 6".
- C) When run, the program will print "9 0 6".
- D) When run, the program will print "9 0 6".

1.9 We typically identify the attributes of the classes in our system by analyzing the \_\_\_\_\_ in the requirements document.

- A) nouns and noun phrases
- B) descriptive words and phrases
- C) verbs and verb phrases
- D) All of the above.

1.10 The UML uses an arrow with a \_\_\_\_\_ to indicate a generalization relationship.

- A) solid filled arrowhead
- B) triangular hollow arrowhead
- C) diamond-shaped hollow arrowhead
- D) stick arrowhead

2. Each statement below is either TRUE or FALSE. Choose the most appropriate one and ENTER in the “OMR” answer sheet supplied with the question paper, following instructions therein. (1x10)

- 2.1 A JPanel cannot be added to another JPanel.
- 2.2 If an attribute of a class is marked with a minus sign (-) in a class diagram, the attribute is not directly accessible outside the class.
- 2.3 An object’s state is indicated by the values of all its attributes at a given time.
- 2.4 All methods declared in an interface are implicitly public abstract final methods and all fields are implicitly public, static and final.
- 2.5 Constructors cannot be inherited or overridden.
- 2.6 Protected members of the superclass are not inherited by the subclass and can only be indirectly accessed.
- 2.7 It is not possible to create arrays of any type with length zero.
- 2.8 A constructor cannot be declared as final.
- 2.9 static, unsigned, and long are keywords in the Java language.
- 2.10 Objects in Java cannot contain other objects; they can only contain references to other objects.

3. Match words and phrases in column X with the closest related meaning/ word(s)/phrase(s) in column Y. Enter your selection in the “OMR” answer sheet supplied with the question paper, following instructions therein. (1x10)

X		Y	
3.1	Class scope concerns accessing members (including inherited ones) from code within	A.	overridden
3.2	Casting can be applied to primitive values as well as	B.	constructo .
3.3	A final method cannot be	C.	a termination test
3.4	super() can only occur as the first statement in a	D.	down casting
3.5	Casting a reference stored in a superclass variable to a subclass type is called	E.	a class
3.6	Iteration and recursion each involve	F.	the String class
3.7	An I/O-performance-enhancement technique in stream is known as	G.	references
3.8	Method compareTo is declared in the Comparable interface and implemented in	H.	buffering
3.9	A dialog capable of displaying a message to the user is displayed with method of class	I.	overloading
3.10	the UML specifies that hollow diamonds be attached to the ends of association lines to indicate	J.	JOptionPane
		K.	JButton
		L.	aggregation
		M.	Composition

4. Each statement below has a blank space to fit one of the word(s) or phrase(s) in the list below. Enter your choice in the “OMR” answer sheet supplied with the question paper, following instructions therein. (1x10)

<b>A.</b>	import	<b>B.</b>	package	<b>C.</b>	instance method
<b>D.</b>	Parentheses, ( ),	<b>E.</b>	Label	<b>F.</b>	JCheckBox
<b>G.</b>	override	<b>H.</b>	switch	<b>I.</b>	java
<b>J.</b>	checked exceptions	<b>K.</b>	abstract	<b>L.</b>	activity diagram
<b>M.</b>	overloading				

- 4.1 At most one \_\_\_\_\_ declaration can appear in a source file, and it must be the first statement in the source file.
- 4.2 A JAR file can only be specified for use with the \_\_\_\_\_ command, in order to run a program.
- 4.3 A class can be declared with the keyword \_\_\_\_\_ to indicate that it cannot be instantiated.
- 4.4 \_\_\_\_\_ can be used to override precedence and associativity.
- 4.5 If no case label is equal to the value of the \_\_\_\_\_ expression, the statement associated with the default label is executed.
- 4.6 The compiler enforces that the \_\_\_\_\_ thrown by a method are limited to those specified in its throws clause.
- 4.7 A subclass can \_\_\_\_\_ a method defined in its superclass by providing a new implementation.
- 4.8 A(n) \_\_\_\_\_ in a subclass cannot override a static method in the superclass.
- 4.9 A(n) \_\_\_\_\_ models the actions the object performs and specifies the order in which it performs them.
- 4.10 When the user clicks a(n) \_\_\_\_\_, an ItemEvent occurs. This event can be handled by an ItemListener object, which must implement method itemStateChanged.

**PART TWO**  
(Answer any **FOUR** questions)

- 5.**
- a) A listener is called when the user does something to the user interface that causes an event. List and explain the MouseListener and MouseMotionListener interface methods.
  - b) A GUI is a graphical (rather than purely textual) user interface to a computer. Explain Lightweight vs. Heavyweight GUI Components. Write the difference between Swing and AWT.
  - c) At any time, a thread is said to be in one of several thread states. Draw UML state diagram of Thread life cycle.

**(5+5+5)**

- 6.**
- a) Every expression written in the Java programming language has a type that can be deduced from the structure of the expression and the types of the literals, variables. Write the conditions to be fulfilled for implicit narrowing primitive conversions on assignment.
  - b) What is inheritance? List the benefits of inheritance? Why java doesn't support multiple inheritances?
  - c) Activity diagrams are graphical representations of workflows of stepwise activities and actions with support for choice, iteration and concurrency. Draw the Activity Diagram for a switch Statement.

**(3+7+5)**

- 7.**
- a) What is interface? How does interface differ from abstract class?
  - b) Various methods correspond to various aspects of an applet's life cycle. List and explain the Applet life cycle methods.
  - c) Write a Java program that demonstrates String methods equals, equalsIgnoreCase, compareTo and regionMatches and using the equality operator == to compare String objects.

**(5+5+5)**

- 8.**
- a) Differentiate following ResultSet constants.
    - 1. TYPE\_SCROLL\_SENSITIVE and TYPE\_SCROLL\_INSENSITIVE
    - 2. CONCUR\_READ\_ONLY and CONCUR\_UPDATABLE
  - b) A class diagram in the Unified Modeling Language (UML) is a type of static structure diagram that describes the structure of a system. Draw the Class diagram for the ATM system model including class Deposit.
  - c) Write a Java program to do addition of given two numbers without using addition (+) operator. (Hint: Use bitwise operator)

**(4+5+6)**

**9.** Write a short note on **any three** of the following:

- a) The RuntimeException Class
- b) Data I/O Streams
- c) Short circuit operators
- d) Aggregation and Composition

**(3x5)**