OBJECT ORIENTED PROGRAMMING WITH JAVA
(MCA1101)

Time Allotted : 2½ hrs   **Full Marks : 60**

Figures out of the right margin indicate full marks.

*Candidates are required to answer Group A and
<u>any 4 (four)</u> from Group B to E, taking <u>one</u> from each group.*

Candidates are required to give answer in their own words as far as practicable.

Group – A

1. Answer any twelve: **12 × 1 = 12**

     Choose the correct alternative for the following

   (i)   Which of the following option leads to the portability and security of Java?
         (a) Bytecode is executed by JVM
         (b) The applet makes the Java code secure and portable
         (c) Use of exception handling
         (d) Dynamic binding between objects.

   (ii) What will be the output of the following Java program?
         class Abc{
                 public static void main(String[]args){
                         String[] elements = { "for", "tea", "too" };
                         String first = (elements.length > 0) ? elements[0]: null;
                 }
         }
         (a) Compilation error   (b) An exception is thrown at run time
         (c) The variable first is set to null   (d) The variable first is set to elements[0]

   (iii) String s1 = new String("AbraCadabra");
         String s2 = new String(" willow woo");
         String s3;
         s3=s1.substring(1,5) + s2.toUpperCase().trim().substring(1,5);
         Referring to the above, what is in s3 after execution?
         (a) braCaWILLO   (b) braCILLO
         (c) braCWILL   (d) braCaILLOW

   (iv) Instance variables in Java are stored in
         (a) Heap   (b) Native Area   (c) Method Area   (d) Stack

   (v)   Which of the following doesn't have a superclass?
         (a) System   (b) Object   (c) Lang   (d) Exception

(vi) Which of these is correct way of calling a constructor having no parameters, of superclass A by subclass B?
(a) super(void);   (b) superclass.();
(c) super.A();   (d) super();

(vii) Which of this class is related to all the exceptions that are explicitly thrown?
(a) Error   (b) Exception
(c) Throwable   (d) Throw.

(viii) Consider the following code
```
package B;
public class A {
        int getSquare (int i) {
                return i * i;
        }
}
```
Referring to the above, what classes can access method getSquare ( ) in class A?
(a) Class A
(b) Class A and all other classes in package B only
(c) Class A, all subclasses of A in package B only
(d) Class A all non-subclasses of A in package B only.

(ix) Which one of the following statements is FALSE?
(a) Java supports multi-threaded programming.
(b) Threads in a single program can have different priorities.
(c) Multiple threads can manipulate files and get user input at the same time.
(d) Two threads can never act on the same object at the same time.

(x) Which of the following are not the methods of the Thread class?
(a) yield()   (b) sleep(long msec)   (c) go()   (d) stop()

Fill in the blanks with the correct word

(xi) _____ Qualifier declares a class variable that is to be shared among all instances

(xii) A subclass can call a constructor method defined by its super class by use of the _____ keyword.

(xiii) A class _____ an interface, while a class _____ an abstract class.

(xiv) _____ can contain default methods.

(xv) _____ is used to specify that the method is not implemented in Java, but rather in another language.

Group - B

2. (a) Write a method (not the entire application) called CountVowels, which takes the input arguments as character and checks whether it is a vowel; increment the instance variable called vCnt by 1.   *[(CO2)(Apply/IOCQ)]*

(b) "String is immutable". State whether the statement is true or false. Justify with an example.   *[(CO1)(Analyze /IOCQ)]*

(c)   Why is Java called a fully object-oriented language but not a pure (or true) object oriented language? *[(CO1)(Understand/LOCQ)]*

6 + 3 + 3 = 12

3. (a)   A unique digit is a positive integer (without leading zeros) with no duplicate digits. For example 7, 135 and 214 are all. Whereas 33, 3121 and 300 are not. Given two positive integers, m and n, where m<n. Write a program to determine how many unique digit integers are there in the range of m and n (both inclusive) and display them. *[(CO2)(Create/IOCQ)]*

    (b)   What is the role of the Java interpreter? What purpose does the Just-in-Time-Compiler serve? *[(CO2)(Remember/LOCQ)]*

    (c)   How are symbolic constants declared in Java? What purpose do they serve? *[(CO2)(Remember/LOCQ)]*

6 + 4 + 2 = 12

Group - C

4. (a)   Show that an inner class has access to the private elements of its outer class. Determine whether the reverse is true. *[(CO3)(Analyze/IOCQ)]*

    (b)   What is a Singleton Class? Illustrate with an example. *[(CO3) (Remember/LOCQ)]*

    (c)   How can a method be protected from being overridden? What benefit is achieved by preventing overriding? *[(CO3)(Understand /LOCQ)]*

5 + 3 + 4 = 12

5. (a)   What happens when a sub-class object is assigned to a super class object reference? Explain with an example. *[(CO3)(Analyze/IOCQ)]*

    (b)   "Programmer can call a constructor from another constructor" – Explain with an example. *[(CO3)(Analyze /IOCQ)]*

    (c)   Write a program that defines a class with one static variable called cnt. Create two or more objects of the class. The class also contains a method that increments the cnt variable whenever a new instance of the class is created. Write a driver class to test the above class. *[(CO3)(Apply/IOCQ)]*

5 + 2 + 5 = 12

Group - D

6. (a)   Prove that the fields in an interface are implicitly static and final. *[(CO4)(Analyse/IOCQ)]*

    (b)   What are checked and unchecked exceptions? Explain with proper examples. *[(CO4)(Remember/LOCQ)]*

    (c)   Can there be a try block without a matching catch block? Can there be a catch block without matching try block? *[(CO5)(Analyze/IOCQ)]*

5 + 3 + 4 = 12

7. (a)   Can a Java class be private in a package? What are the access modifiers applicable to classes and instance variable in Java? *[(CO4)(Remember/LOCQ)]*

    (b)   Give an example where interface can be used to support multiple inheritances. Develop a Java program for the example. *[(CO4)(Analyse/IOCQ)]*

(c) In general which catch statement should come first? The one that catches the subclass or the one that catches the superclass? Why? *[(CO4)(Remember/LOCQ)]*

5 + 5 + 2 = 12

Group - E

8. (a) What is object serialization in Java? Illustrate with an example.
[(CO6)(Remember/LOCQ)]

(b) Explain the Load factor in hashing based collection. If the Load factor exceed the default the size then what will happen, Illustrate with an example.
[(CO6)(Analyse /IOCQ)]

(c) Can you pass lambda expression to a method? When? *[(CO6)(Remember/IOCQ)]*

4 + 4 + 4 = 12

9. (a) What are daemon threads? How would you find out if a thread is daemon? If not, how would you make it a daemon thread? *[(CO5) (Remember/LOCQ)]*

(b) How do you start a thread? What happens if a thread is started with the run ( ) method? *[(CO5) (Remember/LOCQ)]*

(c) What are synchronized methods and synchronized statements? Explain with an example. *[(CO5) (Remember/LOCQ)]*

3 + 4 + 5 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	43.75	56.25	0