Q.P. Code: 36157

(Time: 2½ hours)

Total Marks: 75

N. B.: (1) **All** questions are **compulsory**.
(2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
(3) Answers to the **same question** must be **written together**.
(4) Numbers to the **right** indicate **marks**.
(5) Draw **neat labeled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculators is **allowed**.

1. **Attempt _any three_ of the following:** **15**

a. Write a note on:
  i)   Autoboxing and unboxing
  ii)   Java Development Kit(JDK).

b. List and explain the components of Java Virtual Machine(JVM).

c. Java is called as platform independent and strongly typed language. Justify your answer.

d. Write a Java code to
  i)   check whether the string "madam" is starting and ending with a same letter.
  ii)   countall vowels in a string "welcome".
  iii)   replace 'w' with 'W' in a string "welcome".
  iv)   append "Welcome" and "MADAM"

e. What do you mean by object reference variable in Java? Differentiate between object and reference of a class.

f. Predict the output of the following code:
I)class PassArrArg

```
class PassArrArg
{
  public static void main(String [] args)
  {
    PassArrArg p = new PassArrArg();
    p.start();
  }
  void start()
  {
    long [] a1 = {3,4,5};
    long [] a2 = fix(a1);
    System.out.print(a1[0] + a1[1] + a1[2] + " ");
    System.out.println(a2[0] + a2[1] + a2[2]);
  }
  long [] fix(long [] a3)
  {
    a3[1] = 7;
    return a3;
  }
}
```

[TURN OVER]

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```
II)class Test
{
   public static void main(String [] args)
   {
      int x= 0;
      int y= 0;
     for (int z = 0; z < 5; z++)
     {
        if (( ++x > 2 ) && (++y > 2))
        {
           x++;
        }
     }
   System.out.println(x + " " + y);
   }
}
```

2.   Attempt _any three_ of the following: **15**
a.   Explain how memory is allocated to objects in Java?
b.   Discuss in detail the working of 'foreach' loop in Java.
c.   Explain the need of variable arguments with help of an example.
d.   What is garbage collection in Java? How it is helpful?
e.   When do we use keywords final and static? Explain the working of static member functions.
f.   What do you mean by method overloading? Write a program to implement the concept of constructor overloading.

3.   Attempt _any three_ of the following: **15**
a.   Explain the use of keywords super and this. What are the facts based on which base class constructors will be called while creating derived class objects?
b.   What is an interface? How is an interface different from a class?
c.   Explain the concept of method overriding with the help of an example.
d.   What is the purpose of a package? Explain the steps to create user define packages in Java.
e.   Write a program to implement the concept of multilevel inheritance.
f.   Define an abstract class 'Shape' with an abstract method namely 'CircleArea' taking one parameter that is its radius to compute area of a circle. Now create another class 'Area' containing a method 'CircleArea' for printing the area of circle. Create an object of class 'Area' and test class 'Area'.

4.   Attempt _any three_ of the following: **15**
a.   Why do we need to use vectors? Explain with the help of an example.
b.   Explain life cycle of thread with a neat labeled diagram.
c.   Can we handle multiple exceptions using a single catch block? Justify your answer with an example.
d.   Write a program to demonstrate the use of a class FileInputStream. Accept the input file name at command line.

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e. What do you mean by streams? Explain the concept of streams and types of streams available in Java.
f. Write a program that creates two threads. Each thread is instantiated from the same class. It executes a loop with 10 iterations. Each iteration displays "Welcome" message, sleeps for 200 milliseconds.

5. Attempt _any three_ of the following: **15**
a. What is the use of adapter class in Java? Explain any one of the adapter classes defined in Java.
b. What is the role of layout manager? What is the default layout of frame? Explain its working.
c. How the concept of inner classes helps in Java to handle events? Explain with the help of interface MouseListener.
d. Develop a frame that has three radio buttons Red, Green, Blue. On Click of any one of them background color of the frame should change accordingly.
e. Explain any two overloaded constructors and three methods of class Scrollbar.
f. Write a program to demonstrate the use of Canvas.

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