1776   *Your Roll No. ....*

B.Sc. (Hons.) Computer Science / I Sem.   A
Paper-101 : Programming Fundamentals
(Admissions of 2001 and onwards)

Time : 3 Hours   *Maximum Marks : 75*

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

*Attempt **all** questions.*
Mention the assumptions made in your answers.

1. Write the output(s)/errors and provide reasons for the following :

   (Marks will be given only if a valid reasoning is provided for the answer)

   (i) class PrePostDemo
   ```
   {
   public static void main (String[ ] args)
   {
       int i = 3, j = 5;
       System.out.println (i++ + ++j);
       System.out.println(i+j);
       System.out.println (++i + j++);
   ```

```
        System.out.println ("i="+i+" j="+j);
    }
}
```

2

(ii) class MainTest
```
{
public static void main (String args[ ])
{
    int i = -12;
    int j = i>> 1;
    System.out.println(j);
    i=j<<2;
    System.out.println(i);
}
}
```

2

(iii) class ExeTest
```
{
public static void main (String args[ ])
{
    try
        {double c=5/2.0;}
    catch(Exception e) { }
    catch (ArithmeticException a) { }
}
}
```

1

(iv) public class ForLoop
```
{
public static void main (String[ ] args)
{
    System.out.println("Starting...");
    for ( int i=0; i<0, i++)
        System.out.println ("Looping...");
    System.out.println ("All done.");
  }
}
```
        1

(v) public interface Iface
```
{
void aMethod (int aValue)
{
    System.out.println("Hello");
  }
}
```
        1

(vi) class Tag
```
{
    Tag(int marker)
    {
    System.out.println("Tag(" + marker +")";
    }
}
class Card
{
```

```
Tag t1 = new Tag(1);
Card ( )
{
    System.out.println ("Card( )");
    t3 = new Tag (33);
    }
    Tag t2 = new Tag(2);
    void f( )
    {
        System.out.println ("f( )");
    }
    Tag t3 = new Tag(3);
}
public class Init
{
    public static void main (String args[ ])
    {
        Card t = new Card ( );
        t.f( );
    }
}
```

3

2. (a) What is the purpose of an abstract class ? List the restrictions applicable on an abstract class.

2

(b) Differentiate between an application and an applet.

2

(c) Give reason why main method is defined as static.

2

(d) What is an interface and which object oriented feature does it implement ?

2

(e) Explain how are the parameters passed through reference in Java ? Give examples.

2

3. (a) Write a recursive method *sum (.......)* to calculate the sum of digits of a number which is passed as a parameter to the method.

4

(b) Write a method *binSearch (......., ...)* to perform Binary Search on a list of integers to check whether a number x is present in the list or not. The method should accept the list of integers and the number x as input parameters and return a boolean value.

4

(c) Write a method *addMatrices (......, ...)* to add two integer matrices. The method should accept the matrices as input parameters and return the resultant integer matrix as output.

4

4. (a) Give the signature along with the return type the following string methods and explain their usage with appropriate examples :

   (i) indexOf ( )
   (ii) substring ( )
   (iii) compareTo ( )

$3\times2=6$

(b) Rewrite the following do-while loop as a while loop:

```
do
{
    S = 1.0/n*n;
    X = X + S;
    System.out.println ( S )'
    n++;
} while ( S <= 0.5);
```

2

(c) A class Book contains a method getTitle() and an instance variable title. Given the reference myBook, to a Book object, which of the following expressions are valid ?

   (i) myBook.getTitle()

  (ii) Book.getTitle()

 (iii) myBook.getTitle

 (iv) myBook.title

  (v) Book.title

2

5. (a) Write a program that accepts the names of two text files through command line, reads their contents and prints the contents of first file followed by the contents of second file on the screen. The program should be able to handle all the exceptions that may occur during execution.

6

(b) Write a program to input the number of terms and print the sum of the following series:

1 - 1/2! + 1/3! - 1/4!+ .....

The program should include a method for finding the factorial of a number and must be called while finding the sum of the series.

7

(c) A loop asks the users to enter first name of the person and his/her height. If the name has more than 10 characters, then it should exit from the loop. If the height is more than 6 feet it should exit from the loop. If both inputs are OK, then it should convert the height in feet to inches and print the name and height of the person.

Implement the above loop using the given three strategies:

(i) a boolean variable

(ii) a break statement

(iii) multiple return statements

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6. Differentiate between the following and give examples in each case :

(i) A local variable and a parameter variable

(ii) A try-catch block and a try-finally block

(iii) Method overloading and method overriding

(iv) Scope of variable and life time of variable

(v) Logical and short circuit operators

$5 \times 2 = 10$

7. (a) What is a data type ? What are primitive data types ? List the primitive data types available in java.

2

(b) Identify all the members and constructors in the declaration of the following class *Counter*.

class Counter

{

    final static int MAX_Value = 100;

    static String description = "Counter Generator.".

    int value;

    Counter ( ) { value = 1;)

    Counter (int.initialvalue) { value = initialvalue;}

    int getCounter ( ) { return value;}

    void setCounter (int newvalue)

                      { value = newvalue;)

    void incrementCounter ( ) { ++value; }

    void decrementCounter ( ) { --value; }

    void resetCounter ( ) {value = 0;}

    static String getDescription

                    ( ) {return description;)

2