4|12|18 (M)

Your Roll No...............

Sr. No. of Question Paper : 153   IC

Unique Paper Code   : 42347901

Name of the Paper   : Programming in Java

Name of the Course   : **B.Sc. Mathematical Sciences/
                           B.Sc. (Prog.) – DSE-1A**

Semester   : V

Duration : 3 Hours   Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.

2. **Section A** is compulsory.

3. Attempt any **five** questions from **Section B**.

4. Parts of a question must be answered together.

SECTION A

1. (a) Illustrate the different uses of keyword static with suitable example.   (5)

    (b) Give the output that will be generated on execution of each of the following code segments :   (2×4)

(i)   class A

```
{
    publicstaticvoid main(String[] st)
    {
    int m1 = 6;
        int m2 = 4;
            String s = "7";
            System.out.println(s+m1+m2);
            System.out.println(m1+m2);
    }
}
```

(ii)   class A

```
public static void main(String[] args)
{
    String a = "TEST STRING";
    a = a.substring(4,7);
    char b = a.charAt(1);
    a = a + b;
    System.out.println(a);
}
}
```

(iii)   class Inherit_Single

```
{
    protected int s;
    Inherit_Single()
    {s = 10;}
}

class SubClass extends Inherit_Single
{
    SubClass()
    {s = 11;}
    void display()
    {System.out.println(s);}
```

```
}
class MainClass
{
    public static void main (String args[])
    {
    SubClass obj = new SubClass();
    obj.display();
    }
}
```

(iv)   int sum=0;

     int b[]={1,2,3,4};

     for(int i:b)

         sum=sum+i;

     System.out.println("Sum is"+sum);

(c) What is the purpose of the keyword final? Illustrate its use with the help of an example, in the context of a variable, a method and a class.   (6)

(d) Write a program that accepts as input an integer n, followed by n integers and prints the smallest of these numbers.   (4)

(e) Considering the following declaration·of variables, evaluate the value of the given expression and determine its data type.   (2)

```
int m=1, double s=45.6, char s1='a',
byte  t=23;
```

Expression : $(m*s+s1)+t$

SECTION B

2. (a) Write a method searchFirst(s1, s2) to search the first instance of a given substring s2 within another string s1 and return the starting index of s2 (assume that search is successful). (5)

(b) Illustrate the notion of method overloading and method overriding in java with suitable examples. (5)

3. (a) Write a code segment in java to do the following : (6)

   • Declare an interface Rectangle in package Pack1

   • Declare another package Pack2 and implement the interface Rectangle to calculate the area of rectangle.

(b) Give the output of the following : (4)

```
int rec_sum(int n)
{
    if (n<=1)
        return n;
    elsereturn n+rec_sum(n-1);
}
```

Show the runtime stack when the method rec_sum is called with the argument 5.

4. (a) What is Dynamic method Dispatch? Illustrate with the help of an example. (4)

(b) Consider the following files file1.java and file2.java : (6)

```
//file1.java
package mypack1;
public class A
{
  int  a1;
  private int  a2;
  protected  int  a3;
  public  int  a4;
    :
}
```

```
class B
{
   :
}
class C extends A
{
   :
}
//file2.java
package mypack2;
import mypack1.*;
class D
{
   :
}
class E extends A
{
   :
}
```

Which variables of class A are accessible in classes B, C, D and E? Why?

5. (a) State the purpose of the methods used in the lifecycle of an applet. (5)

(b) Write a code to create an applet with background color red that displays a message "HELLO WORLD". (5)

6. (a) Write a java program to copy the contents of file file1.txt to file file2.txt. (4)

(b) Consider classes A, B, and C where B is subclass of A and C is a subclass of B. Define constructors in each class to display the name of the class and determine the order of their execution. (6)

7. (a) Write a java program to accept an integer at the runtime. The program should throw and handle a user defined exception MyException if the number entered is a negative number. (6)

(b) What is multilevel inheritance? Given the definition of the class Person with data members name and age, define the subclass Employee with data members Emp_id, Company_name, Designation and Salary. Write methods to (i) input (ii) display the data members. (4)

8. (a) Differentiate : (2×3)

    (i) Byte Stream and Character Stream

    (ii) == and equals

    (iii) String and StringBuffer class

(b) What will be the output on execution of the following code : (4)

```
classTest
{
    publicstaticvoidmain(String args[])
    {
        intx = -3;
        System.out.println(x>>1);
        System.out.println(x<<1);
        inty = 4;
        System.out.println(y>>1);
        System.out.println(y<<1);
    }
}
```