[This question paper contains 10 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4541 **E**

Unique Paper Code : 32341201

Name of the Paper : Programming in Java

Name of the Course : **B.Sc. (H) Computer Science**

Year of Admission : 2019-2020 onwards

Semester : II

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. The question paper consists of **two** sections. **Section A** is compulsory. Attempt any **four** questions from **Section B**.
3. State the assumptions taken, if any, in your answers.
4. All parts of a question must be answered together.
5. The data types of variables/data members/arrays and return types of the methods should be clearly stated.

P.T.O.

SECTION A

(Compulsory)

1. (a) Identify valid and invalid literals from the following : (1×5=5)

(i) int a = 0_x56;

(ii) byte b = $xyz;

(iii) char c = a4;

(iv) float pi = 3.14_15F;

(v) int d= 0x85_;

(b) What is the purpose of Dynamic Method Dispatch? How can this method be implemented? Explain with the help of an example. (5)

(c) Assuming that all necessary packages have been imported (where required) in the following Java code snippets, write the output(s) of the following : (2+3=5)

(i)
```
class ABC {
    public static void main(String [] args) {
        int a = 5;
        int b = 6;
```

```
        String s1 = "7";
        System.out.println (s1 + a + b);
        System.out.println (a + b);
    }
}
```

(ii)
```
class Demo {
    static {
        System.out.println ("In static block");
    }
public static void main(String [ ] args) {
        System.out.println ("In main method");
    }
}
```

(d) (i) How is a class prevented from being inherited? Illustrate with the help of an example. (3)

(ii) Given the following hierarchy of Java classes, write the order in which the constructors are called when an object of class z is instantiated. (2)

```
class A {. . .}

class B extends A {. . .}

class C extends B {. . .}
```

(e) Name the event listener interface(s) notified when each of the following event occurs in a Java program. (1×5=5)

(i) When a mouse is pressed.

(ii) When a component gains focus.

(iii) When a key is typed.

(iv) When a mouse is dragged.

(v) When a window is activated

(f) Write statements in Java to create a two-dimensional array that has 3 rows. Row 1 has 3 columns; row 2 has 1 column and row 3 has 2 columns. Also write a for-each loop statement to print this array. (5)

(g) Given two integer variable x = –1 and y = 0, write the value of x and y after the following expressions are executed : (5)

(i) x++;

(ii) y = x++;

(iii) x > 24;

(iv) x >> 24;

(v) x >>> 24;

SECTION B

2. (a) What is the purpose of the super keyword in Java? (2)

(b) Assuming that all necessary packages have been imported (where required) in the following Java code snippets, write the output(s) of the following : (4+4=8)

(i)
```
class X {
    int 1 = 9;
class Y extends X {
    int i = 90;
    void showSuper () {
        System.out.println (i);
        System.out.println (super.i);
    }
}
```

```
class Demo {
    public static void main (String args[ ]) {
        Y a = new Y ( );
        a.showSuper ( ) ;
    }
}
```

(ii)
```
class Show {
    public static void main (String [ ] args) {
        int x = 9; y = 0;
        if (++x == 1 && ++y == 1)
        System.out.println (x);
        System.out.println(y);
    }
}
```

3. (a) What is AWT in Java? How are events handled using AWT? Explain using an example. (5)

(b) Using Java AWT, write a program to create two buttons named "Alpha" and "Beta". When a user clicks on the Alpha button , the background color changes to Red color while clicking on the Beta button, the background color changes to Blue color. (5)

4. (a) How can a protected member of Java class be accessed by its subclass in a different package? Illustrate with an example. (4)

(b) Explain the use of try with resources statement in Java. (2)

(c) Write a program in Java using enhanced for loop to find out the sum of values in an array. (4)

5. (a) Explain the usage of the keywords throw, throws and finally used in managing exception handling in Java. Is it possible to use multiple catch blocks with a single try block? Explain with an example. (6)

(d) Rewrite the following code segment to handle the exception(s) that will occur on executing the following codes segments : (2+2=4)

(i)
```
public static void main (String [ ] args) {
    int x = 97, y = 0;
    int z = x/y;
    System.out.println (z);
}
```

(ii)
```
int a[ ] = new int [20];
a[20] = 20;
```

6. (a) Explain with suitable example, the concept of method overloading and method overriding in java. (4)

(b) Differentiate between final and abstract modifier in Java. (2)

(c) Assuming that all necessary packages have been imported (where required) in the following Java code snippets, write the output(s) of the following : (4)

```
class Base {
    public final void show( ) {
        System.out.println("Base class function called");
    }
}
class Derived extends Base {
    public void show( )
        System.out.println("Derived class function called");
    }
}
class Main {
    public static void main (String[ ] args) {
        Base b = new Derived ();
        b.show();
    }
}
```

7. (a) What are Event Listeners in Java? Mention its two major requirements. How they are helpful in the delegation event model? (4)

(b) Write a program in Java using AWT to display a string "Hello" in frame window and set its background color as Red. (3)

(c) Write the prototypes of any three methods of the MouseListener interface. (3)

8. (a) Write a program in Java to print the following pattern. (5)

1

2 4

3 6 9

4 8 12 16

5 10 15 20 25

(b) Write a program in Java to input a 2-dimensional array of integers and print the greatest odd number and the smallest even number present in the array. (5)