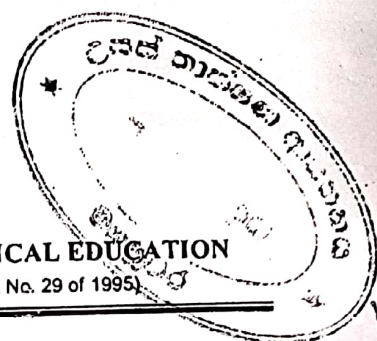# SLIATE

SRI LANKA INSTITUTE OF ADVANCED TECHNOLOGICAL EDUCATION

(Established in the Ministry of Higher Education, vide in Act No. 29 of 1995)

Higher National Diploma in Information Technology
First Year, Second Semester Examination – 2018
HNDIT1209- Object Oriented Programming

Instructions	No. of questions : 06
Answer any five (05) questions.	No. of pages : 06
	Time : Three hours

Question 01 (Total 20 marks)

I. What is Java **Application Programming Interface** (API)? (03 marks)

II. Write three features of the Java programming language. (03 marks)

III. What would be the output of the java code segments given below? (06 marks)

    a. System.out.print("\'SLIATE\n");
       System.out.print("\"Sri Lanka");

    b. int p=100;
       int q=200;
       System.out.println(p<q ||++p<q);
       System.out.println(p);

    c. int a=10;
       int b=20;
       int x=(a>b)?100:200;
       System.out.print(x);

IV. State whether the following statements are true or false (08 marks)

    a. ".class" is the extension of java source code file.

    b. Static variables are declared with the static keyword in a class, but outside a method, constructor or a block.

    c. JDK is used to compile, debug and execute a java program.

    d. $main is a valid identifier in java.

    e. Access modifiers can be used for local variables.

f. Multiplication and division operators have a higher precedence than addition and subtraction operators in Java.

g. Java's automatic Garbage Collection can be controlled by a program.

h. Java is a platform independent language.

Question 02 (Total 20 marks)

I. State three control structures in java. (3 marks)

II. What would be the output of the java code segment shown below? (3 marks)

```
int value=2;
while(value<=10){
if(value==6 || value ==8){
        break;
}
System.out.println(value);
value+=2;
}
```

III. Distinguish between

   a. **if** and **switch**

   b. **while** and **do - while** (06 Marks)

IV. Write a java program to prompt user to enter an integer through the key board and then display the number pattern as shown below using a for loop(s).

Enter an Integer --> 4	Enter an Integer --> 6
4444	666666
333	55555
22	4444
1	333
	22
	1

(08 marks)

Question 03   (Total 20 marks)

I.   Write the general syntax of creating an array in java.   (03 marks)

II.   What is the usage of wrapper classes in java? State two examples of java wrapper classes.   (03 marks)

III.   a. What is an **exception** in Java?   (03 marks)

        b. What would be the output of the java program given below?   (03 marks)

```java
class Tryex{
  public static void main(String args[]){
    int []a={5,10,20,40,80,160};
    int []b={5,10,0,5,10};
    for(int i=0;i<a.length;i++){
    try{
      System.out.println(a[i]+"/"+b[i]+"is"+a[i]/b[i]);
    } catch(ArithmeticException exc){
      System.out.println("Exception 1");
    } catch(ArrayIndexOutOfBoundsException exc){
      System.out.println("Exception 2");
    }
    }
  }
}
```

IV.   Write answers to questions from a to c by considering the given JAVA code segment.

         String Ob1 = "First String";

         String Ob2 = "Second String";

         String Ob3 = Ob1;

Write the outputs of following code segments (a-c)

a. System.out.println(Ob1.length());

b. System.out.println(Ob2.charAt(7));

c. System.out.println(Ob3.substring(1,4));

d. Write a Java code segment to compare Ob1 and Ob2.if both are equal display "Equal" otherwise display "Different".   (08 marks)

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Question 04 (Total 20 marks)

I.   Define the following terms in the context of object oriented programming:

     a.   Class

     b.   Object

     c.   Constructor   (03 marks)

II.   What is the difference between this and super keyword in java?   (04 marks)

III.   What is the output of the program shown below? Explain your answer. (03 marks)

```
class Test {
public static void main(String args[]){
    final int x;
    x = 20;
    x = 30;
    System.out.println(x);
}
}
```

IV.   Consider the following scenario.

You are asked to design an Atom class using JAVA language. Write the Atom class with following properties.

     a.   Create the Atom class with three encapsulated instance variables of type integer: protons, neutrons and electrons;

     b.   Protected class variable called electronCharge of type integer.

     c.   Constructor method to initialize encapsulated variables with passing arguments from calling program.

     d.   Two public methods :

               void setProtons(int p);   - to set protons of the atom

               int getNeutrons();   - to return neutrons of the atom

     e.   Write the code segment to create an instance of the Atom class

                                                  (10 marks)

Question 05   (Total 20 marks)

I.   Briefly describe two object-oriented programming concepts.   (04 marks)

II. What are abstract and concrete classes in Java?   (04 marks)

III. What would be the output of the program given below?

Which object-oriented programming concept(s) is represented through the

program?   (04 marks)

```java
class Vehicle{
  void display (){
     System.out.println("Display Vehicle Number");
  }
}
class Car extends Vehicle{
  void display (){
     System.out.println("Display Car Number");
  }
  public static void main(String args[]){
     Car c1=new Car();
     Vehicle c2=new Car();
     c1.display();
     c2.display();
  }
}
```

IV. Consider the following java program to answer the questions given below.

```java
interface Account{
double amount=200000.00;
double iRate();
}
class FixedAccount implements Account{
 public double iRate(){
      return 20.0; }
}
class SavingsAccount implements Account{
 public double iRate(){
      return 40.0;  }
}
class AccountType{
 public static void main(String args[]){
 Account acc1=new FixedAccount();
 System.out.println(acc1.iRate());  }
}
```

a. What is an interface in Java? (03 marks)

b. What is the output from the main()? (02 marks)

c. Is it possible to change the value of the amount variable being in the AccountType class? Justify your answer. (03 marks)

Question 06 (Total 20 marks)

I. What is a Java thread? (02 marks)

II. State two ways to create threads in Java. (04 marks)

III. Mention two benefits of using javax.swing package to create java GUI. (02 marks)

IV. Explain the output of the program given below using an appropriate diagram. (08 marks)

```
import javax.swing.*;
class HelloWorld
{
public static void main(String args[])  {
    JFrame f= new JFrame("Calculation Form");
    JLabel lbl1,lbl2; JButton cmd1; JTextField tf1,tf2;
    lbl1=new JLabel("First Value :");  lbl1.setBounds(50,50, 100,30);
    lbl2=new JLabel("Second Value: "); lbl2.setBounds(50,100, 100,30);
    tf1=new JTextField();  tf1.setBounds(150,50,100,30);
    tf2=new JTextField(); tf2.setBounds(150,100,100,30);
    cmd1= new JButton("Add"); cmd1.setBounds(150, 150, 75, 30);
    f.add(lbl1); f.add(lbl2); f.add(tf1);f.add(tf2);f.add(cmd1);
    f.setSize(300,300);  f.setLayout(null);  f.setVisible(true);
  }
}
```

V. Write a java program to display the java applet shown below. (4 marks)

```
Applet

  _____

  HNDIT

  _____

```