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 – 2021

HNDIT 2012– Fundamentals of Programming

Instructions for Candidates:	No. of questions: six (06)
Answer any **five (05)** questions.	No. of pages : 05
	Time : Three (03) hours

Question 01 **(Total 20)**

i. What is a computer language? (02 marks)

ii. "Java is a platform independent language" justify this statement. (02 marks)

iii. List three features of an integrated development environment. (03 marks)

iv. Derive the answer for the following Java expressions. (04 marks)

a. 5 + 6 * 2 - 8

b. 80 – 6 % 4 / 2

c. 5 % 2 * 4 > 5 || 4 % 2 * 5 < 7

v. What would be the output of the following code segments? (04 marks)

a.
```
int x = 5, y = 10, temp;
temp = y;
y = x;
x = temp;
System.out.println("x=" + x);
System.out.println("y=" + y);
```

b.
```
int k = 5, j = 9;
k += k++ – ++j + k;
System.out.println("k=" + k);
System.out.println("j=" + j);
```

vi. Write a java program to get the volume of a sphere when radius is 47. Clearly define the constants and variables in your program.
Hint: Volume of a sphere = (4/3) * pie * r^3 (05 marks)

Question 02 **(Total 20)**

i. Write the syntax of if else control structure. (02 marks)

ii. Compare nested if and switch case control structures? (04 marks)

iii. Write the output of following code segments. (06 marks)

a.
```
int age = 20;
String result;
result = (age < 18) ? "Not Eligible." : "Eligible.";
System.out.println(result);
```
Eligible.

b.
```
int n1 = 10, n2 = 10 , n3 = 40;
if (n1 != n2++ || n2 > n3)
    n3 += n1;
else
    n3 %= n1;
System.out.print(n1 + "  " + n2 + "  " + n3);
```
10 11 10

c.
```
char lowerLetter = 'g', upperLetter = 'H';
boolean result;
result = (lowerLetter = = 'g') && (upperLetter = = "G");
if (!result){
    int x = 65, y = 35;
    if (x > y){
            System.out.println ("x is larger than y");
    }
}
System.out.println ("Flow of the program is proper.");
```
True. False. ~~False~~

x is larger than y

Flow of the program is proper

iv. Write a Java program to get an integer from the user and to check whether it is odd or even using switch case. (08 marks)

Question 03 **(Total 20)**

i. What is an infinite loop? (02 marks)

ii. Select the most suitable looping structure (for/while/do-while) for the following scenarios. Justify your answer for each scenario. (06 marks)

a. Scenario: You want to execute a block of code at least once, regardless of the condition, and then repeat it based on a condition evaluated at the end of the loop. do while

b. Scenario: You need to iterate over a fixed number of elements and know the exact number of iterations beforehand. for

c. Scenario: You want to repeat a block of code based on a condition that is evaluated at the beginning of the loop. The number of iterations is not known in advance. while.

iii. Explain the purpose of break and continue keywords inside a Java iterative control structure, providing two coding examples. (06 marks)

iv. Write a java program to print numbers from 20 to 10. Get the total of the numbers in this range and print it. (06 marks)

Question 04 **(Total 20)**

i. Compare and contrast variables and arrays in terms of their characteristics. (02 marks)

ii. What is an exception in Java? (02 marks)

iii. Explain the output of the below code segment with the cause of the exception it throws. Provide a modified code snippet to handle the exception. (06 marks)

```
int[] numbers = {1, 2, 3, 4, 5};
System.out.println(numbers[6]);
```

iv. Write a java code segment to store the matrix shown below in a two-dimensional array.

(04 marks)

23	34	56
45	56	78

v. Write a java code segment to copy the values in an integer array to a new array in reverse order. (06 marks)

Original array	10	20	30	40	50
Reverse array	50	40	30	20	10

Question 05 **(Total 20)**

(abstraction / encapsulation / polymorphism / method overloading / method overriding / Methods / interfaces / public / protected / reusability / inheritance / extensibility / private)

i. Fill in the blanks using the above keywords. (05 marks)

a. _____ is the process of hiding internal details and providing a public interface to interact with an object.

b. In Java, we can achieve encapsulation using access modifiers such as _____ (accessible to all), _____ (accessible only within the class), and _____ (accessible within the class and its subclasses).

c. _____ is a mechanism in which a subclass inherits the properties and behaviors of a superclass. It promotes code _____ and _____.

d. _____ is the ability to have multiple methods with the same name but different parameters in the same class.

e. _____ is a concept where a subclass provides a specific implementation of a method that is already defined in its superclass.

f. In Java abstraction can be achieved by abstract classes and _____.

ii. Write a Java class Rectangle with the following properties and behaviors. (08 marks)

a. Properties: length(int) , width(int)

b. Behaviours: calArea() – to calculate the area and return the answer.

: calPerimeter() – to calculate and print the perimeter within the method.

iii. Write a Jave class MainRectangle with the main method. (07 marks)

a. Create an object of the Rectangle class implemented above.

b. Assign two integers to length and width instance variables.

c. Print the area and the perimeter of it.

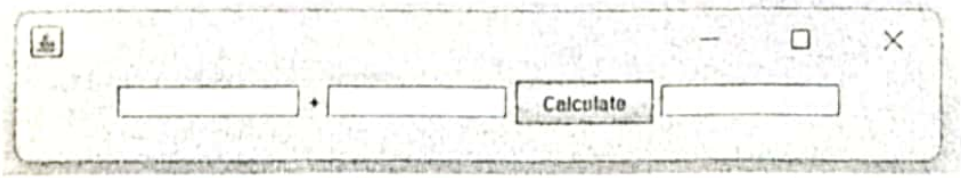
D:

Question 06 **(Total 20)**

i. What is the use of Java Swing framework? (02 marks)

ii. What is event handling in Java? Write three steps to handle an event with Java Swing. (04 marks)

iii. Write the java code to create below interface using Java Swing. (08 marks)



iv. User will input two numbers and when click on Calculate button total will be displayed in the last text box. Fill in the blanks to handle the event using Listener interface. (06 marks)

```
import java.awt.event.*;

class Calculater extends JFrame implements ____(a)____{
    private JTextField firstNumber;
    private JLabel additionLabel;
    private JTextField secondNumber;
    private JButton calculateButton;
    private JTextField calcAnswer;
    public void setGUI() {
        // code to create, add components and set size, layout and visibility

        calculateButton.____(b)____(this);  //register listener to the button
    }

    public void ____(c)____(ActionEvent e){
        int fNumber, sNumber = 0;
        fNumber = ____(d)____(firstNumber.getText());
        sNumber = ____(e)____(secondNumber.getText());
        int ____(f)____ = fNumber + sNumber;
        calcAnswer.____(g)____(Integer.toString(answer));
    }

    public static void main(String args[]){
        Calculater  t1 = new Calculater ();
        t1.setGUI();  } }
```