# THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY

# DEPARTMENT OF MATHEMATICS & COMPUTER SCIENCE

## FIRST SEMESTER EXAMINATIONS - 2023

## SECOND YEAR BACHELOR OF SCIENCE IN COMPUTER SCIENCE

## CS210 – Programming III

### TIME ALLOWED:  2 HOURS

### INFORMATION FOR CANDIDATES

1. Write your name and student number clearly on the front of the examination booklet.
2. You have 10 minutes to read this paper. You must not begin writing during this time.
3. **There are 6 questions.** You should **answer all** the questions.
4. Do **not** use red ink.
5. All answers must be written in examination booklets only. No other written material will be accepted.
6. Notes and textbooks are not allowed in the examination room.
7. All mobile phones and electronic/recording devices must be switched off during the examination.

## MARKING SCHEME

Marks are indicated at the beginning of each question. The total is 80 marks.

| Questions | Marks |
|-----------|-------|
| Question 1 | 30 |
| Question 2 | 10 |
| Question 3 | 10 |
| Question 4 | 10 |
| Question 5 | 10 |
| Question 6 | 10 |
| **Total** | **80** |

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**Question 1 (3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 = 30 marks)**

a. What is OOP?

b. What is a constructor? Name the 3 types of constructors.

c. What is abstraction? What specifiers are used to achieve abstraction?

d. What do you mean by "one interface multiple methods"? Explain the concept.

e. What is meant inheritance in java? Does java support multiple inheritance?

f. Write the general form or syntax of interface.

g. What is meant by method overriding?

h. What is the use of the keyword "super"? What are the 2 uses of "final" keyword?

i. What are the three methods and PACKAGES in java for:

      1) Creating a file,

      2) Writing a file,

      3) Reading file.

j. What is java swing? What does the package javax.swing provide?

## Question 2 (2 + 2 + 1 + 1 + 1 + 1 + 2 = 10 marks)

There are 7 errors in the below java program. Analyse to find and list out the line number and errors. Write the solution for those lines only.

```
1.  class Base
2.  {
3.          int a;
4.          assign(int x)
5.          {
6.                  a=x;
7.                  return a;
8.          }
9.  }
10. public class ShowResult
11. {
12.         int a;
13.         int assign(int x)
14.         {
15.             a=x;
16.         }
17.     Public Static void main (String args[])
18.     {
19.         Base Obj01 = new Base ()
20.         ShowResult obj02 = new ShowResult();
21.         Obj01.assign(10);
22.         Obj02.assign(20);
23.         System.out.println("Base Class a = "+ Base.Obj01.a);
24.         System.out.println("ShowResult Class a = "+ Obj02.a);
25.     }
26. }
```

## Question 3 (5 + 5 = 10 marks)

a. Write a simple program to implement concept of abstraction and encapsulation. Program to store name and age. Name variable to be public. Age variable to be private. Use constructor to initialise the private variable age. Name can be initialised according to your own logic. **Scanner class not necessary**. Create at least 2 classes. First class for storing the details and initialisation.

b. Another class for creating main () method and objects. Finally display the name and age.

**Question 4 (2 + 5 + 3 = 10 marks)**

a. What is run-time polymorphism in java? How it is achieved?

b. Explain with a small program question given to justify run-time polymorphism. The program question is; create a class called vehicle and a method called moving (). This method can contain a print statement. Create a subclass called bike derived from super class. This class should contain the same method of super class called vehicle. Here you can print a statement like "bike is moving". In this class you should create an object in the main () method and prove the concept of run-time polymorphism. Inputs are not required here.

c. What is meant by method-overloading?

**Question 5 (3 + 2 + 5 = 10 marks)**

a. What do you mean by an interface?

b. To explain interface as above create an interface only. Name the interface as "Moving". It should have a variable named avg_speed and a method named move ().

c. Create a class called "Vehicle" which implements the above interface created. The interface method should be implemented in this class by printing the detail such as speed. Create an object in this class to display the method. Scanner class not required. Print statements are required to display the working.

**Question 6 (7 + 3 = 10 marks)**

a. Write a java program to implement file concepts to write any content to a file.

b. Include the code to close the file in the same program.

So, your program should include logic to write and close only.

**End of Examination**