

# ZIMBABWE EZEKIEL GUTI UNIVERSITY



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FACULTY OF SCIENCE, TECHNOLOGY, AGRICULTURE AND FOOD  
SYSTEMS DEVELOPMENT

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DEPARTMENT OF INFORMATION SYSTEMS

## EXAMINATION PAPER

COURSE CODE: BIS212  
COURSE TITLE: OBJECT ORIENTED PROGRAMMING  
SPECIAL REQUIREMENTS: NONE  
LEVEL: 2  
EXAM DURATION: 3 hours  
DATE: JUNE 2024

14 JUN 2024

### INSTRUCTIONS TO CANDIDATES:

1. Answer any **four** questions
2. Number your answers accordingly
3. Start each question on a new page
4. Use C, C++, C#, Java or Python for code.

### Question 1

(a) Describe the following four pillars of object-oriented programming:

- (i) Inheritance
- (ii) Polymorphism
- (iii) Encapsulation
- (iv) Abstraction

[2x4marks]

(b) Distinguish between a class and an object

[2marks]

(c) Create a class named **Trade** with properties: **counter** (string), **volume** (integer), and **price** (double). The class should contain a constructor that takes in parameters for the properties and initializes them. Implement getter and setter functions for the properties, and a void method named **Compute** that computes and displays the consideration realized from a trade according to the formula:

$$\text{Consideration} = \text{volume} * \text{price}$$

Create an instance of the Trade class

[10marks]

### Question 2

(a) Give an example of the use of operator overloading in an object-oriented programming language

[4marks]

(b) Describe method/function overloading and give an example

[4marks]

(c) Describe with the aid of an example what is meant by a method signature

[4marks]

(d) Study the code snippet below:

```
public interface Transaction{
    date transdate;
    string transcode;
    double amount;
    void Compute();
}

void main(){
    Transaction trans = new Transaction ();
}
```

Explain why the code in the snippet fails when executed [8]

### Question 3

(a) Study the code below:

```
class Student{
    private string StudentNumber;
    private int Age;
}
void Main(){
    Student student1 = new Student();
    student1.Age = 12; //error
}
```

Explain why the code fails when an attempt is made to assign a value to the property Age. [4marks]

(b) Explain the difference between a static constructor and a non-static constructor [4marks]

(c) Briefly discuss the following access specifiers:

- (i) Private
- (ii) Public
- (iii) Protected

[2x3marks]

(e) Explain how multiple inheritance can be implemented and give an example [6marks]

### Question 4

(a) With the aid of a diagram distinguish between a base class and a derived class as used in object-oriented programming [4marks]

(b) Explain how a class implements an interface [2marks]

(c) Describe two ways of passing parameters to a function [4marks]

(d) Study the following Java program segment and answer the questions that follow:

```

public class Student {
    name;
    int age;
    String gender;
    double IdNo;

    public Student (String name) {
        this.name = name;
    }

    public void studAge (int studAge){
        age = studAge;
    }

    public void studGender (String studGender){
        gender = studGender;
    }

    public void studId (double ){
        IdNo = studId;
    }

    public void printStudent (){
        System.out.println ("Name: " + name);
        System.out.println ("Age: " + age);
        System.out.println ("Gender: " + gender);
        System.out.println ("Id Number: " + IdNo);
    }
}

```

- (i) Explain two access specifiers used in the program segment [2 marks]
- (ii) Explain the significance of the keyword void in the program. [2 marks]
- (iii) Identify the constructor method [2 marks]
- (iv) Identify any two class methods in the segment. [2 marks]
- (v) Identify two errors in the program. [2 marks]

### Question 5

- (a) What is an object? [2marks]
- (b) Give four examples of how object-oriented programming helps with the development of large software projects and explain why each one is helpful. [8marks]
- (c) Using an example in each case, differentiate between a structure and a class [6marks]
- (d) Explain FOUR rules of using a destructor in Object oriented programming. [4marks]

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