BINDURA UNIVERSITY OF SCIENCE EDUCATION
FACULTY OF SCIENCE AND ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE

BSc HONS DEGREE IN COMPUTER SCIENCE

CS112/SWE201/EEE2203: OBJECT ORIENTED PROGRAMMING I

DURATION: 2 HOURS 30 MINUTES TOTAL MARKS: 100

INSTRUCTIONS TO CANDIDATES:
The paper consists of Section A (Theory) and Section B (Practical)
Answer **ALL** questions

All programs to be written in c++.

JUN 2025

SECTION A (40 MARKS)

Question 1

a. With aid of a code snippet outline the two ways of defining a member function in C++. [5]

b. Expound the dot operator (.) in c++. [5]

c. List **three** pros and two **cons** of inline functions in c++. [5]

Question 2

a. Differentiate static and dynamic polymorphism. [6]

b. Identify and explain the four types of inheritance in c++. [8]

c. What is a scope resolution operator. [4]

d. Define constructor overloading using code snippet. [8]

SECTION B (60 MARKS)

Question 3

Write a c++ program to solve the quadratic equation using formular in figure 1 and the following specifications ;

a. Create a class called **QuadraticEquation** that has three data members: **a, b,** and **c** which are the coefficients of the quadratic equation and two member functions: **getDiscriminant()** and **getRoots().**

b. The **getDiscriminant()** function calculates the discriminant of the quadratic equation, which is a value that determines the nature of the roots. If the discriminant is positive, the roots are real and distinct. If the discriminant is equal to 0, the roots are real and equal. If the discriminant is negative, the roots are complex and distinct.

c. The **getRoots()** function calculates the roots of the quadratic equation. It uses the quadratic formula to calculate the roots, and it returns a **pair** object containing the two roots.

d. The main function of the program prompts the user to enter the coefficients of the quadratic equation. It then creates an object of the **QuadraticEquation** class and calls the **getRoots()** function to get the roots of the equation. The program then prints the roots of the equation to the console. **[20]**

$$x_1 = \frac{-b + \sqrt{b^2 - 4ac}}{2a}, \quad x_2 = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

Figure 1. Quadratic equation formular.

Question 4

Write a C++ program declare a class polygon having data members **width** and **height**. Derive classes **rectangle** and **triangle** from **polygon** having **area ()** as a member function. Calculate area of **triangle** and **rectangle** using pointer to derived class object. **[20]**

Question 5

Write a C++ program to define a class **Employee** having data members **emp_no**, **emp_name** and **emp_designation**. Derive a class **Salary** from **Employee** having data members **basic**, **hra**, **da**, **gross_ sal**. Accept and display data for one employee. **[20]**

**********END OF PAPER**********