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**KIRIRI WOMEN'S UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**UNIVERSITY EXAMINATION, 2024/2025 ACADEMIC YEAR**  
**FIRST YEAR, SECOND SEMESTER EXAMINATION**  
**FOR THE DIPLOMA IN INFORMATION & COMMUNICATION TECHNOLOGY**  
**DIT 1006 – OBJECT ORIENTED PROGRAMMING**

Date: 3<sup>RD</sup> December 2024  
Time: 11:30AM – 1:30PM

**INSTRUCTIONS TO CANDIDATES**

**ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS**

**QUESTION ONE (30 MARKS)**

- a) Discuss the advantages of polymorphism in C++, particularly in the context of designing flexible and maintainable software systems. (2 Marks)
- b) Using examples, explain two methods for adding comments in C++ code and discuss why commenting is essential for team collaboration in software projects. (4 Marks)
- c) Identify and explain the benefits of Object-Oriented Programming (OOP) compared to procedural programming in a real-world software development context. (4 Marks)
- d) Describe two methods for defining functions that are associated with a class in C++. Provide examples relevant to a real-world application, such as a class for a customer in a retail system. (4 Marks)
- e) Outline the general rules for naming variables in C++ and discuss their importance in maintaining readable code in collaborative projects. (4 Marks)
- f) C++ includes various types of operators, including logical operators used to assess relationships between variables. Describe the logical operators in C++ and provide examples that illustrate their use in a decision-making scenario, such as user authentication. (6 Marks)
- g) Explain the three access specifiers in C++ and their relevance in controlling access to class members, using a case study of a banking system. (6 Marks)

**QUESTION TWO (20 MARKS)**

- a) Write a simple C++ program that prompts the user to input two numbers and then calculates and displays their sum. Relate this to a budgeting application. (10 Marks)
- b) Write a straightforward C++ program that outputs "Hello World!" without using the namespace directive, discussing its significance as a first step in learning programming. (5 Marks)
- c) Provide a step-by-step explanation of the following C++ program, focusing on its logic and structure in the context of an educational software tool. (5 Marks)

**QUESTION THREE (20 MARKS)**

- a) Explain the various data types used in C++. (5 Marks)
- b) Declare the various data types used in C++ mentioned above giving example in real-world programming scenarios (5 Marks)
- c) Explain the different types of variables defined with various keywords in C++, providing examples that illustrate their usage in real-world applications, such as a student information system. (10 Marks)

**QUESTION FOUR (20 MARKS)**

- a) Explain the concept of inheritance in C++, detailing its two categories and their practical applications in developing scalable software solutions. (4 Marks)
- b) Describe the different arithmetic operators used in C++ for common mathematical operations, including examples related to financial calculations in a business application. (5 Marks)
- c) Highlight the key characteristics of constructors in C++, explaining their importance in the initialization of objects in a software system. (5 Marks)
- d) Identify and describe three access specifiers in C++, discussing how they control access to class members and their impact on software security. (6 Marks)

**QUESTION FIVE (20 MARKS)**

- a) State the two primary types of polymorphism in C++ and explain how they enhance code flexibility in software projects. (4 Marks)
- b) Identify and explain the types of constructors in C++, discussing their roles in object-oriented design. (6 Marks)
- c) Write a C++ program that allows a high school student to enter values to calculate the area of a circle, demonstrating the application of formulas in a practical context. (10 Marks)