

JEREMIAH NYAGAH NATIONAL POLYTECHNIC

DEPARTMENT OF ICT

UNIT TITLE: DEVELOP COMPUTER PROGRAM

COURSE: ICT LEVEL 6

CAT 2

TOTAL MARKS: 50

DURATION: 1 HOUR 30 MINUTES

### **Instructions**

- i. Answer **ALL** questions.*
- ii. Be **concise** and use clear examples where necessary.*
- iii. Write **clean, well-commented Java code** for the coding question.*

### **SECTION A:**

**1. Define the following software engineering terms: (5 Marks)**

- a) Software Engineering
- b) Software Development Life Cycle (SDLC)
- c) Algorithm
- d) Pseudocode
- e) Debugging

**2. Discuss five main stages of the Software Development Life Cycle (SDLC), explaining the main activity in each stage. (5 Marks)**

**3. Define Agile methodology and explain five key principles of Agile software development. (5 Marks)**

**4. Explain the following Object-Oriented Programming principles and show how each contributes to good software design: (8 Marks)**

- a) Encapsulation
- b) Inheritance
- c) Polymorphism
- d) Abstraction

5. Differentiate between the following pairs of concepts: (8 Marks)

- a) Procedural programming vs Object-Oriented programming
- b) Class vs Object
- c) Interface vs Abstract class
- d) Method Overloading vs Method Overriding

6. Explain **four characteristics of good software** according to software engineering standards. (4 Marks)

7. Describe **three advantages of using Agile methodology** over traditional Waterfall SDLC in modern software projects. (5 Marks)

8. Write a Java program that demonstrates Object-Oriented Programming principles: (10 Marks)

- i. Create a class Student with private attributes name, regNo, and marks.
- ii. Include a constructor to initialize the values.
- iii. Add methods:
  - a) calculateGrade() — returns a grade (A, B, C, D, or E) based on marks.
  - b) displayDetails() — displays student name, registration number, marks, and grade.
- iv. In the main method, create **two Student objects** and display their details.