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****

1. *Answer* ***ALL*** *questions.*
2. *Be* ***concise*** *and use clear examples where necessary.*
3. *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

1. Explain **four characteristics of good software** according to software engineering standards. (4 Marks)
2. Describe **three advantages of using Agile methodology** over traditional Waterfall SDLC in modern software projects. (5 Marks)
3. Write a Java program that demonstrates Object-Oriented Programming principles: (10 Marks)
4. Create a class Student with private attributes name, regNo, and marks.
5. Include a constructor to initialize the values.
6. Add methods:
   1. calculateGrade() — returns a grade (A, B, C, D, or E) based on marks.
   2. displayDetails() — displays student name, registration number, marks, and grade.
7. In the main method, create **two Student objects** and display their details.