**061055117A**

**DEVELOP COMPUTER PROGRAM**

**APRIL 2025**

**Time: 2 HRS**

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**THE KENYA COAST NATIONAL POLYTECHNIC**

**DEPARTMENT OF INFORMATION COMMUNICATION TECHNOLOGY**

**ICT TECHNICIAN LEVEL 6**

**DEVELOP COMPUTER PROGRAM**

**2 hours**

**Instructions to Candidates**

**You should have the following for this examination:**

**- Answer Booklet**

***Answer all questions in SECTION A and any THREE in SECTION B***

***Candidates must not write anything on the question paper.***

***Maximum Marks for each part of the question are as indicated***

**SECTION A (*40 Marks*)**

1. Define the following terms: **[4 Marks]**
2. Variable
3. Linker
4. Pointer
5. Constant
6. In Object Oriented Programming, the term class and object are used to define real life scenarios. Differentiate between the two. **[4 Marks]**
7. The following are in-built functions used in C programming. Explain what they are used for:
   1. printf() **[2 Marks]**
   2. strcat() **[2 Marks]**
8. Constants are known to be memory location that don’t change during program execution. Explain **TWO** ways of creating constants in a C program. **[4 Marks]**
9. Matara has hired you to use Java language in developing a program that will aid in teaching. As an expert, state **FOUR** reasons why you will employ use of references. **[4 Marks]**
10. Reserved words can’t be used with any other meaning. Identify **FOUR** such words in Java programming. **[4 Marks]**
11. Explain one reason that would make a programmer use each of the following escape sequences in Java. **[4 Marks]**
12. **\t**
13. **\\**
14. Control structures control the execution of a program. State **FOUR** selection control structures

**[4 Marks]**

1. The following is a program statement used in a Java programming. Use it to answer the questions that follows:

*Animal animal = new Animal( );*

Explain the following parts of the statement:

1. New  **[2 Marks]**
2. Animal() **[2 Marks]**
3. A C program demonstrates basic input and output operations. Write a program that prompts a user to enter length and width of a rectangle and outputs the Area of the rectangle. **[4 Marks]**

**SECTION B (*60 Marks)***

**Choose *any THREE in SECTION B***

1. a) The future value (fv) of a property worth principal Value(pv) appreciating at the rate of r% per annum for a period of t years is given by the formula

fv=pv \* (1 + (rate / 100)) ^ t

Write a Java program to calculate fv when a user enters the values of pv, r and t.

The program should then display the result rounded to two decimal places. Comment your code.**[6 Marks]**

b) Write a pseudo code that would compute ***Area of a Circle*** after the user has entered the radius of the circle. **[4 Marks]**

c) Write a C program based on the pseudo code to calculate the area of a circle. **[6 Marks]**

d) You have been tasked with managing a software project for a client. State four reasons why you would adopt the spiral model of project management. **[4 marks]**

1. a) Inheritance in Java is a mechanism that allows a class to inherit properties and behaviors from another class.Write another class named *Cat* that inherits Animal behavior and adds its own functionality. **[8 Marks]**

*class Animal {*

*// Method in the parent class*

*void MakeSound() {*

*System.out.println("Animal makes sound");*

*}*

*}*

b) Write the Main class to test the behavior of the Cat class. **[8 Marks]**

c) State **FOUR** advantages of documenting a program.**[4 Marks]**

1. a) Briefly explain the significance of comments in a program. **[2 Marks]**

b) The program development life cycle can be broken down into various stages. Describe **FOUR** crucial stages in the software development life cycle. **[8 marks]**

c) A fitness center offers discounts on membership fees based on the duration of membership entered by a client. The base membership fee is set to Kshs 10,000. The discounts are structured as follows:

|  |  |
| --- | --- |
| **Duration (months)** | **Discount** |
| 1 | 5% |
| 3 | 10% |
| 6 | 15% |
| 12 | 20% |
| Above 12 | 25% |

Write a C program that receives the duration of the membership in months from the user. The program should then calculate the discount based on the duration and output the net amount payable. Use the *switch statement*. **[10 Marks]**

1. a) Write a Java program that computes the cube of numbers 0 to 5 and displays the result formatted as follows. The Program then gives the output as follows: **[6 marks]**  
   **Number Cube**
2. 1
3. 8
4. 27
5. 64
6. 125

b) Write a program in Java language that prompts the user to enter numeric values and stores them in an array. The program then sorts the elements in the array and outputs them on the console. **[8 marks]**

c) Explain **THREE** types of errors that are likely to be detected during testing and debugging

**[6 Marks]**