061006T4ICT

ICT TECHNICIAN LEVEL 6

IT/OS/ICT/CR/10/6

DEVELOP COMPUTER PROGRAM

JULY/AUGUST 2023

TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION COUNCIL (TVET CDACC)

WRITTEN ASSESSMENT

TIME: 3 HOURS

INSTRUCTIONS TO CANDIDATE

1. This paper has two sections **A and B.** Attempt questions in each section as per instructions given in the section.
2. You are provided with a separate answer booklet.
3. Marks for each question are indicated in the brackets.
4. Do not write on the question paper

SECTION A: (40 MARKS)

Attempt ALL questions in this section.

1. Distinguish between imperative programming and object programming languages, giving TWO examples in each (6 Marks)
2. Identify TWO valid reasons for a software developer to use each of the following approaches in a project.
   a) Waterfall Model (2 Marks)
   b) Agile Methodology (2 Marks)
   c) Spiral Model (2 Marks)
3. Using C language examples, explain ONE program control structure for:
   a) Decision/Branching (4 Marks)
   b) Looping (4 Marks)
4. Define the following program development phases (7 Marks)
   a) Planning
   b) Analysis
   c) Design
   d) Implementation
   e) Testing
   f) Deployment
   g) Maintenance
5. Explain THREE program design tools. (6 Marks)
6. Describe FOUR building blocks of object-oriented programming (OOP) (4 Marks)
7. Using Java language, illustrate ONE example of the following error types.
   a) Syntax error (1 Mark)
   b) Run time error (1 Mark)
   c) Logic error (1 Mark)

SECTION B: (60 MARKS)

Attempt any THREE (3) questions in this section.

8. Design a program to calculate and output the area and perimeter of a rectangular football field using:

   a) Pseudocode (10 Marks)

   b) A Flowchart (10 Marks)

9.

   a) The following C++ program is intended to calculate and display the mean score of 10 students who sat for "Computer programming" test. Identify the errors in the program. (10 Marks)

```
#include<iostream.h>;
#define STUDENTS 10
INT main()
{
   Int count;
   float testScore[STUDENTS];
   float sumOfScores, averageOfScores
   sum=0;
  // Enter the 10 test scores and update the sum
for(count=1;counter<STUDENTS;count++)
{
   cout<"Enter a score ";
   cin>>testscore[count];
   sumOfScores = sumOfScores+testScore[count];
}
// calculate the average score
```

```
averageOfScores = sumOfScore/Students;

/Output the average score
cout<<"The Average Score is: " <<averageofSCores;

return 0;
```

b) Explain FIVE benefits of using functions in program development. (10 Marks)

10. Consider the following program conditional requirements.

If the Purchase Amount is greater than Sh.50,000
If Customer Duration is 5 Years and Above Then
Customer Pays 90% of Purchase Amount (10% Discount)
Else
Customer Pays 92.5% of Purchase Amount (7.5% Discount)
Else
If Customer Duration is 5 Years and Above Then
Customer Pays 97%% of Purchase Amount (3% Discount)
Else
Customer Pays Full Purchase Amount

Express the above requirements in the form of:

a) A Decision Tree (10 Marks)

b) A Decision Table (10 Marks)

11. Consider the following Java program that uses the Inheritance concept.

```
class Calculation {
int z;

public void addition(int x, int y) {
   z = x + y;
   System.out.println("The sum of the given numbers:"+z);
}

public void Subtraction(int x, int y) {
```

```
        z = x - y;
        System.out.println("The difference between the given
      numbers:"+z);
    }
}

public class My_Calculation extends Calculation {
    public void multiplication(int x, int y) {
        z = x * y;
        System.out.println("The product of the given
      numbers:"+z);
    }

    public static void main(String args[]) {
        int a = 20, b = 10;
        My_Calculation demo = new My_Calculation();
        demo.addition(a, b);
        demo.Subtraction(a, b);
        demo.multiplication(a, b);
    }
}
```

a) From the program, identify the following program components

i)	The base class/superclass	(1 Mark)
ii)	Base class method(s)	(2 Marks)
iii)	The derived class/subclass	(1 Mark)
iv)	Subclass method(s)	(1 Mark)
v)	Method parameters	(2 Marks)
vi)	Object	(1 Mark)
vii)	Constructor	(1 Mark)
viii)	Object communication/Message passing	(3 Marks)

b) What is the output of the program? (3 Marks)

c) Modify the subclass to include a method to calculate the quotient (result of division) and have the object call the method (5 Marks)