TEVETA

DIPLOMA IN COMPUTER STUDIES

LEVEL 6 EXAMINATIONS

FINAL INTEGRATED SUMMATIVE EXAMINATION

NOVEMBER/DECEMBER 2019

SUBJECT: ADVANCED PROGRAMMING

TIME ALLOWED: 3 HOURS

TOTAL MARKS: 100

PASS MARK: 50

INSTRUCTIONS TO CANDIDATES:

1. Write the examination number and the National Registration Card Number on the answer booklet provided
2. There are Seven (7) questions in this paper
3. Attempt any five (5) questions of your choice
4. Cell phones and programmable calculators are not allowed in the examination room

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

QUESTION 1

Explain the following concepts in OOP.

a) Encapsulation (4 marks)
b) Methods (4 marks)
c) Message passing (4 marks)
d) Inheritance (4 marks)
e) Polymorphism (4 marks)

[Total: 20 Marks]

QUESTION 2

a) Write a program to calculate the modulus of a number (8 marks)
b) Explain two (2) benefits of providing a 'methods-only' barrier between the object and its users (4 marks)
c) Explain the application of Artificial Intelligence in
   i) Games (2 marks)
   ii) Expert systems (2 marks)
   iii) Natural language processing. (2 marks)
   iv) Pattern recognition. (2 marks)

[Total: 20 Marks]

QUESTION 3

a) Explain the details of what is involved in the following states of program compilation;
   i) Code optimization (5 marks)
   ii) Parsing (4 marks)
   iii) Intermediate code generation (5 marks)
b) Write a program that user enter marks of 20 students and display the highest mark. (6 mark)

[Total: 20 Marks]

QUESTION 4

a) The program below in C++ in incomplete. It should basically let a user enter the name, voltage and current ratings of an electrical appliance and display the resistance and power of this appliance. The comments (after the //) should be replaced with code. use the comments to guide you to complete the program. (12 marks)

```
#include <iostream>
using namespace std;
class Appliance{
 private :
      float Voltage, Current;
      string name;
 public:
      void EnterDetails()
      {
          // here put code to enter the name, voltage
        // and current of an appliance
      }
      float GetPower()
      {
          // calculate the power as voltage x current
      }
      float GetResistance()
      {
          // here return the resistance as voltage/current
      }
};
int main() {
  // here declare an object from the Appliance class
  // here let the user enter the details of the appliance
  // display the resistance and power of the appliance

  return 0;
}
```

b) Explain two benefits that inheritance brings about in OOP. (6 marks)

c) What is meant by data member with regard to classes. (2 marks)

[Total: 20 Marks]

QUESTION 5

a) Object Oriented Programming breaks the separation between data and it functions/procures. Explain this statement. (4 marks)

b) Look at the following facts in a knowledge base expressed in prolog.

Friends(Mark, James)
Friends(Jame, Kate)
Musician(Janet)
Musician(Kelly)
Oddnumber(13)
Evennumber(12)

State the output for each of the following queries

i) ?- Friends (Mark,Janet) (2 marks)

ii) ?- Musician(Janet) (2 marks)

iii) ?- Oddnumber(15) (2 marks)

iv) ?- Evennumber(12) (2 marks)

v) ?- Friends(James,Kate) (2 marks)

vi) ?- Musician(Kelly,Janet) (2 marks)

vii) ?- Evennumber(16) (2 marks)

viii) ?- Friends(Kim,Janet) (2 marks)

[Total: 20 Marks]

QUESTION 6

You have been tasked as a developer with the task of developing a mobile banking program. The banking system should provide such tasks as creating new accounts, withdrawing, depositing, being able to check the balance in the account and withdraw from the account if there are enough funds for the amount requested. For each account records details like phone number, NRC number, and account balance

a) Create a class that can be used to fulfil these tasks. (13 marks)

b) Write a statement that creates an object from the class created. (2 marks)

c) Write statements that can pass a message to

i) Let someone enter account details (2 marks)

ii) Let a user withdraw from the account (2 marks)

iii) View the account balance (1 mark)

[Total: 20 Marks]

QUESTION 7

a) Explain four (4) advantages that modular programming brings about (8 marks)

b) Explain the role that a parsing tree plays during program compilation. (4 marks)

c) Write a program in C++/VB/Java that lets a user enter a number and then the program comments if this number entered is a prime number or not. (6 marks)

d) Name two (2) data types used in programming languages. (2 marks)

[Total: 20 Marks]

```
#include <iostream>
using namespace std;
int main()
{
int num;
cin>>num;
if(num%==0)
{
cout<<num<<"is even";
}
Return 0;
}
```