TEVETA

DIPLOMA IN COMPUTER STUDIES

TQF 6 LEVEL III EXAMINATIONS

FINAL INTEGRATED SUMMATIVE EXAMINATIONS

SITTING: AUGUST 2016

SUBJECT: PROGRAMMING III

TIME: THREE (3) HOURS **TOTAL MARKS: 100**

PASS MARK: 50

INSTRUCTIONS TO CANDIDATE

1. Write your Examination Number and National Registration Card Number on the answer booklet
2. There are seven (7) questions in this booklet
3. You are required to attempt any five (5) questions
4. All questions carry **equal** marks
5. Cell-phones and programmable calculators are **NOT** allowed in the examination room

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

QUESTION 1

a) Describe briefly the following terms

i) Class
ii) Object
iii) Data member
iv) Member Function
v) Single inheritance
vi) Multiple inheritance

(1 mark each)

b) Languages which support multiple inheritance can be used to create ambiguous references to methods. Give an example of such a situation. **(7 marks)**

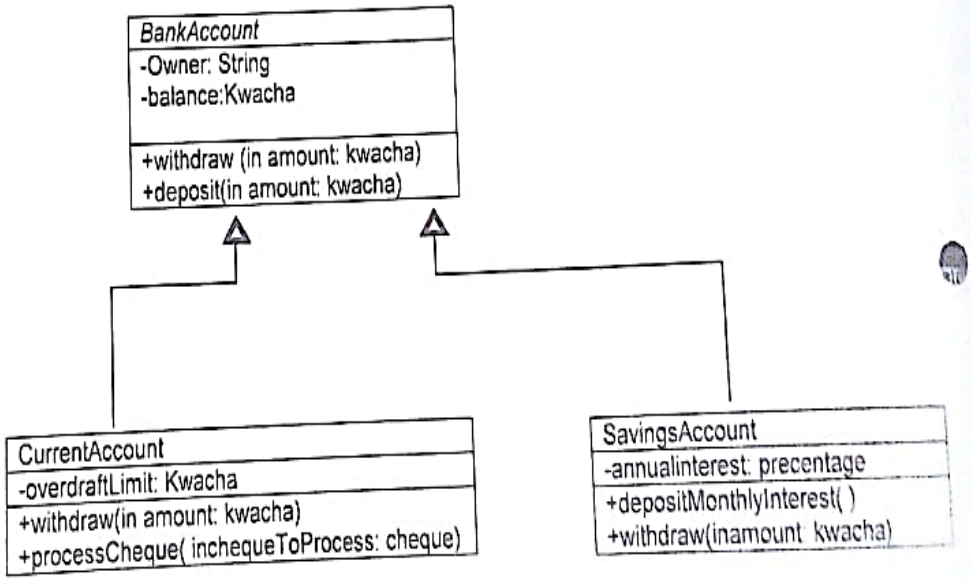
c) Discuss whether support for multiple inheritance is a necessary prerequisite for support for polymorphism in an object oriented programming language. **(7 marks)**

(Total: 20 marks)

QUESTION 2

(a) Describe the way in which the Unified Modelling Language (UML) can be used to design an object oriented program **(8 marks)**

(b) Using an object oriented programming language of your choice, *write* code which represents the UML diagram shown below: **(12 marks)**



(Total: 20 marks)

QUESTION 3

(a) Some object-oriented programming languages, such as Python, are interpreted. Others, such as C++, are compiled. Distinguish between the terms *interpreted* and *compiled*. **(4 marks)**

(b) Polymorphism is broadly classified into two types: *parametric* and *ad-hoc*. Distinguish between these two forms of polymorphism. **(4 marks)**

(c) Distinguish between *mutable* and *immutable* objects, providing one example situation in which each would be an appropriate choice. **(6 marks)**

(d) One of the principal features of object oriented languages is subtype polymorphism. In this context, explain the terms *covariant*, *contravariant*, and *invariant* **(6 marks)**

(Total: 20 marks)

QUESTION 4

(a) Briefly explain the following in the context of object oriented programming:

i) Class
ii) Object **(2 marks)**

(b) Describe two types of class members used in object oriented programming languages. **(6 marks)**

(c) Explain how three types of class member visibility are used in object oriented programming. **(6 marks)**

(d) Using an object oriented language with which you are familiar, give an example of a class definition which illustrates the use of the concepts you described in your answer to parts (b) and (c). **(6 marks)**

(Total: 20 marks)

Question 5

(a) Early programming languages did not support an object oriented approach to programming. Explain why and how object oriented programming languages have been developed. (5 marks)

a) (b) Describe FIVE features you would expect to be present in an object oriented programming language. Give an example of how each feature is realized in an object oriented programming language with which you are familiar. (15 marks)

[Total 20 Marks]

Question 6

Discuss the evolution of the programming languages from first to fifth Generations stating the main features. (20 marks)

[Total 20 Marks]

Question 7

Explain the stages of that the compiler undergoes during the translation of a program. (20 marks)

[Total 20 Marks]