Name_____ Index No._____/_____

2920/203
OBJECT ORIENTED PROGRAMMING
July 2013
Time: 3 hours

Candidate's Signature _____

Date_____

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY

MODULE II

OBJECT ORIENTED PROGRAMMING

3 hours

INSTRUCTIONS TO CANDIDATES:

*Write your **name** and **index number** in the spaces provided above.*
*Sign and write the **date of examination** in the spaces provided above.*
*Answer any **FIVE** of the following **EIGHT** questions.*
All questions carry equal marks.

For Examiner's Use Only

Question	1	2	3	4	5	6	7	8	Total Marks
Marks									

This paper consists of 22 printed pages.

Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

Turn over

1. (a) (i) Outline **three** characteristics of *member functions* as used in Object Oriented Programming languages. (3 marks)

(ii) I. Define the term *operator overloading* as used in Object oriented Programming languages. (2 marks)

II. State **two** rules applied when overloading an operator. (2 marks)

(b) (i) Outline **three** examples of *derived data types* as used in Object Oriented Programming. (3 marks)

(ii) Describe the term *memory leak* as used in Object Oriented Programming. (2 marks)

(c) With the aid of a diagram, describe the flow of execution in a program developed using *procedural programming* approach. (4 marks)

(d) Distinguish between the following C++ program statements:

```
string myname("AnnJoy");
string myname="AnnJoy";
```

(4 marks)

2. (a) (i) Explain **one** advantage of using *free store* in a C ++ program. (2 marks)

(ii) State **two** disadvantages of using *modular programming* approach when developing a program. (2 marks)

(b) The following is a C++ program segment. Use it to answer the question that follows.

```
#include<iostream.h>
class figure
  {
    public:
     int shape(int dim)
       {
            return (dim*dim*dim);
            }
  };
int main ()
 {
   figure cub;
   int dimension;
   dimension=0;
      cout<<"Enter the dimension : ";
      cin>>dimension ;
   cout << "The shape volume is: " <<
cub.shape(dimension)
   << endl;
   return 0;
 }
```


Outline the output from the program segment when each of the following dimensions are inputted in the program.

(i) 20 (2 marks)

(ii) 5.5 (2 marks)

(c) (i) Describe **one** rule of *inheritance* as applied in C++ programming language.

(2 marks)

(ii) Explain **two** rules applied when creating a *destructor* function in an Object Oriented Programming language. (4 marks)

(d) Write a C++ program that has;

- One class named shapes;
- Two objects named sphere and circle
- A member function that calculates the area of a circle;
- A member function that calculates the volume of a sphere.

The program should prompt the user to enter a radius, compute the area of the circle and the volume of the sphere using the radius entered and then output the radius, area, and volume. (6 marks)

3. (a) Outline **two** characteristics of *objects* as used in Object Oriented Programming languages. (2 marks)

(b) (i) Describe the term *persistent object* oriented databases as used in Object Oriented Programming language. (2 marks)

(ii) Describe each of the following terms as used in Object Oriented Programming language.

I. script operator; (2 marks)

II. conversion operator. (2 marks)

(c) (i) State **two** ways of invoking a *destructor* function in Object Oriented programs. (2 marks)

(ii) Distinguish between a *class* and a *structure* as used in C++ programming. (4 marks)

(d) Write a C++ program that prompts the user to enter the dimension of a square. The program should then compute the area of the square through an inline function and then output the area. (6 marks)

4. (a) State **two** advantages of using Object Oriented Programming languages when developing a system. (2 marks)

(b) Explain the term *runtime polymorphism* as used in Object Oriented Programming language. (2 marks)

(c) (i) Differentiate between *static binding* and *dynamic binding* as used in C++ programming. (4 marks)

(ii) Faith has been advised to overload the *new* and *delete* operators while coding a C++ program. Outline **four** advantages that she would gain from this approach. (4 marks)

(d) (i) Under what circumstance would the *scope resolution operator* be used in a C++ program. (2 marks)

(ii) Write a C++ program that has the following data members and member functions:

Data members;

- Account number;
- Amount of balance in the account;

Member functions:

- Accept Deposited amount
- Default constructor to initialize the variables
- Display account name and balance.

The program should accept account number and amount entered for depositing. The program should then output the account number and Account balance. (6 marks)

5. (a) Outline the function of each of the following classes as used in C++ Programming language:

(i) fstreambase; (1 mark)

(ii) streambuf; (1 mark)

(iii) filebuf. (1 mark)

(b) Explain the term *argument matching* as used in C++ programming. (2 marks)

(c) (i) With the aid of an example in each case, differentiate between *simple data* type and *user defined data* type as used in C ++ programming. (4 marks)

(ii) Given that the values of a,b,c, and d are 4,8,1, and 2 respectively, evaluate the following C++ statement.

$X=(a\%d)+(b*c)\ \%a*d-c^3$ (4 marks)

(d) The following is a list of algebraic expressions. Use it to answer the question that follows.

N1=9+ 5y
N2=4+ 2y
N3=N1+ N2

Write a C++ program that accepts N1 and N2 and performs the addition operation through overloading the plus sign operator, the program should then display the value of N3. (7 marks)

6. (a) Explain **two** uses of a *static function* as used in C++ programming. (2 marks)

(b) (i) With the aid of an example in each case, differentiate between *enumerated* and *typedef* specifiers as used in C++ programming. (4 marks)

(ii) Explain a circumstance under which a class inheritance would be used in Object Oriented Programming language. (2 marks)

(c) (i) The following are operators used in C++ programming language.
|| & ++ :: <<
Arrange them in the order of their execution precedence. (2 marks)

(ii) The following is a list of C++ constants.
Ox4b 'p' 3.14 30ul "Lengo" 85 Oxff 9008
Categorize them as integer, *character*, *string* or *floating* point.
(4 marks)

(d) Use figure 1 to answer the question that follows.

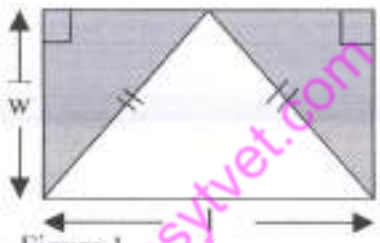

Figure 1

Write a C++ program to implement a base class named *dimensions*, with two data members called *length* and *width* and a member function called display. The program should have two derived classes named *triangle* and *rectangle* each with a data member named *units* and a member function called *setvalue*. The program should implement constructors to initialize the data members appropriately, calculate and display the area of the unshaded area.
(6 marks)

7. (a) (i) Explain **two** rules to be observed when using *virtual functions* in Object Oriented Programming language. (4 marks)

(ii) State **one** reason that would justify overloading of an operator. (2 marks)

(b) (i) Outline **two** circumstances that may lead to *file operation* failure during program execution. (2 marks)

(ii) Mary would like to write a C++ program that outputs data on a file named *output.dat*. Write a C++ program statement that would be used

8. (a) The following is a C++ program segment. Use it to answer the question that follows.

```
Class generalObject
{
    Float a,b=5;
    Void Setvalue();
}
```

Identify **two** errors in the program segment. (2 marks)

(b) (i) Outline a circumstance under which a *copy constructor* would be used in Object Oriented Programming language. (2 marks)

(ii) Create a union in C++ programming language named employee which contains the following fields: Employee identification number, employee name, basic salary, hours worked, rate per hour and rate of taxation. (4 marks)

(ii) With the aid of a diagram in each case, describe each of the following relationships as used in Object Oriented Programming language.

I. a-kind-of; (2 marks)

II. is-a. (2 marks)

(d) Write a C++ programs that has:

- One static object named *number*.
- Two data functions named *num1* and *num2*
- Two void member functions called *show* and *plus*

The program should accept num1 and num2 and then increment them by 2 through the *plus* function. The program should then output the result through the *show* function. (4 marks)