2920/203
OBJECT ORIENTED PROGRAMMING
November 2018
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY

MODULE II

OBJECT ORIENTED PROGRAMMING

3 hours

INSTRUCTIONS TO CANDIDATES

*This paper consists of **EIGHT** questions.*
*Answer any **FIVE** of the **EIGHT** questions in the answer booklet provided.*
All questions carry equal marks.
Candidates should answer the questions in English.

This paper consists of 6 printed pages.

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

1. (a) Outline **three** differences between *Object Oriented paradigm* and *Procedural programming paradigm.* (6 marks)

(b) Describe an *Identifier* citing the rules followed to create it in C++ programming language. (4 marks)

(c) Distinguish between *state* and *behaviour* of an object as used in Object Oriented Programming. (4 marks)

(d) Write a C++ program that prompts the user to enter an integer x from the keyboard and displays the result when the integer is multiplied by 2. The output should display the following on the screen.

Output:
Please enter an integer value:_
Value you entered is _ and its result is _. (6 marks)

2. (a) Table 1 shows C++ programming language escape sequences. State the purpose of each. (2 marks)

	Escape sequence
(i)	\n
(ii)	\f

Table 1

(b) Explain each of the following data types as used in C++ programming language:
(i) typedef;
(ii) enumerated datatype;
(iii) reference. (6 marks)

(c) Outline the role of each the following keywords in a switch case control structure:
(i) break;
(ii) default. (4 marks)

(d) With the aid of syntax code, explain each of the following as used in C++ programming:
(i) namespace;
(ii) pure virtual functions. (8 marks)

3. (a) State **four** characteristics of a C++ static member function. (4 marks)

(b) With the aid of a syntax code, explain the C++ *goto* control structure. (4 marks)

(c) Distinguish between the following pairs of pointer functions in C++:
(i) seekg and seekp;
(ii) tellg and tellp. (4 marks)

(d) A C++ class is defined with the following code:

```
class PUBLISHER
{
        char Pub[12];
        double Turnover;
protected:
        void Register();
public:
        PUBLISHER();
        void Enter();
        void Display();
        };
                class BRANCH
                        {
                        char CITY[20];
                protected: float Employees;
                public: BRANCH();
                        void Haveit();
                        void Giveit();
                        };
        class AUTHOR : private BRANCH, public PUBLISHER
        {
                int Acode;
                char Aname[20];
                float Amount;
                public: AUTHOR();
                void Start();
                void Show();
        };
```


(i) Write **four** names of member functions which are accessible from objects belonging to class AUTHOR. (4 marks)

(ii) Write **four** names of data members which are accessible from the class AUTHOR. (4 marks)

4. (a) State **four** areas where array datatype may be used. (4 marks)

(b) Table 2 shows a C++ program code segment. Identify **four** errors in the code. (4 marks)

```
class circle
{
private
float radius;
public:
void getdata();
{
cout<<" Enter the radius ";
cout<<radius;
}
float area();
}
circle:: float area()
{
return (3.14 *radius*radius);
}
```

Table 2

(c) Write a C++ program function that inserts an element at a desired point in an array B. (8 marks)

(d) Given an array A [6][16] whose base address is 100. Determine the location A [2][5] if each element occupies 4 bytes and the array is stored row wise. (4 marks)

5. (a) Outline **two** rules followed when inheriting constructors. (2 marks)

(b) State **four** characteristics of the friend function. (4 marks)

(c) Explain the role of a mutable class member in C++ programming. (4 marks)

(d) (i) Distinguish between ISA and HASA class relationships. (4 marks)

(ii) Figure 1 shows a representation of a type of inheritance between base classes A, B and a derived class C:

(I) identify the type of inheritance; (6 marks)

(II) Write a C++ syntax code to implement the inheritance.

Figure 1

6. (a) (i) Describe a constructor as used in C++ programming. (2 marks)

(ii) State **two** ways of calling a constructor in a C++ program. (2 marks)

(b) Explain abstraction as used in object oriented programming. (4 marks)

(c) Distinguish between a *destructor* and an *explicit constructor*. (4 marks)

(d) Rewrite the corrected code for the following C++ structure element. (8 marks)

```
#include <iostream.h>
structure Supergym
{
        int member number;
        char membername[20];
        char membertype[] = "HIG";
};
void main()
{
        Supergym personl, person2;
        cin<<"Member Number:";
        cin>>personl.membernumber;
        cout<<"Member Name :";
        cin>>personl.membername;
        personl.member type = "MIG";
        person2 = personl;
        cin<<"Member Number:"<<person2.membernumber;
        cin<<"Member Name"<<person2.membername;
        cin<<"Member Number:"<<person2.membertype;
}
```


7 (a) State **two** characteristics of C++ variables. (2 marks)

(b) Differentiate difference between *method overloading* and *method overriding*. (4 marks)

(c) Explain each of the following as used in polymorphism:

(i) late binding;

(ii) Function hiding. (6 marks)

(d) Champo a second year diploma student has been given the following tasks:

- Create an abstract class called Shape which contains a pure virtual function called find_vol() and a protected attribute named as volume;
- Create two new derived classes from the above class named as Cube and Sphere having double type attribute named as side and radius respectively;
- Implement dynamic polymorphism to find out volume of a cube, a sphere and display the result.

Write a C++ program code to accomplish the tasks. (8 marks)

8. (a) Outline the function of each of the following as used in C++:

(i) *ifstream;*

(ii) *ofstream.*

(4 marks)

(b) Table 3 shows string functions in C++.Outline the purpose of each function

(3 marks)

	function
(i)	strcat(S1, S2)
(ii)	strcpy(S1, S2)
(iii)	strupr(s)

Table 3

(c) Write a C++ function to count the number of words in a text file named "OUT.TXT".

(8 marks)

(d) A C++ program segment is represented as follows:

```
int c, d; cin>>c;
d=(c<10)?-1: ((c>10) ?1:0);
cout<<d;
```

(i) draw a test table for the inputs when c = -10 and 5;

(ii) rewrite the code using if....else statements.

(5 marks)

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