

2920/203

OBJECT ORIENTED PROGRAMMING

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Time: 3 hours

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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.

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Turn over

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 __.
- Cin << Cout << Cout << T1*
- (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)

<pre> class circle { private float radius; public: void getdata(); { cout<<" Enter the radius "; cout<<radius; } float area(); } circle:: float area() { return (3.14 *radius*radius); } </pre>	<p><i>Should not have ;</i></p> <p><i>Should be End of "Enter the radius";</i></p> <p><i>missing function body</i></p> <p><i>Should not have ;</i></p>
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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; *Multiple Inheritance*
- (II) Write a C++ syntax code to implement the inheritance. (6 marks)



Figure 1

6. (a) (i) Describe a constructor as used in C++ programming. *Object initialization* (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 person1, person2;
    cin << "Member Number:";
    cin >> person1.membernumber;
    cout << "Member Name :";
    cin >> person1.membername;
    person1.member type = "MIG";
    person2 = person1;
    cin << "Member Number:" << person2.membernumber;
    cin << "Member Name" << person2.membername;
    cin << "Member Number" << person2.membertype;
}
```

- (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: (6 marks)
- late binding; *runtime polymorphism*
 - Function hiding.
- (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*; reads from file *if* is used for writing
- (ii) *ofstream*; writing inside

(4 marks)

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

(3 marks)

	function
(i)	strcmp(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".

len() *ifstream("OUT.TXT", ios::in);*

(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.

if c < 10
{
d = -1
}
else if c > 10
{
d = 1
}

(5 marks)

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