2920/203
OBJECT ORIENTED PROGRAMMING
July 2019
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY

MODULE II

OBJECT ORIENTED PROGRAMMING

3 hours

INSTRUCTIONS TO THE CANDIDATE:



*This paper consists of **EIGHT** questions.*
*Answer **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 5 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) Define each of the following terms as used in Object Oriented Programming:

(i) Object;

(ii) Variable. (4 marks)

(b) Differentiate between *token* and *identifier* as used in programming. (4 marks)

(c) Determine the output of the following C++ statements:

```
char c = 'A';
short m = 26;
int n = c+m;
Cout<<" n"
```

(2 marks)

(d) (i) With the aid of C++ syntax code explain *instance variable*. (4 marks)

(ii) Johan designed an object-oriented program, the program failed to compile due to incorrect identifier declarations. Explain **three** rules he should have followed. (6 marks)

2. (a) Identify the type of error that will be generated in each of the following cases:

(i) Division by a variable that contains a value of zero;

(ii) Multiplication operator used for division;

(iii) Missing semicolon. (3 marks)

(b) (i) Explain **two** types of class access specifiers in C++. (4 marks)



(ii) Write a C++ expression for the following mathematical equations:

$(z = x^3 + y^3 - xy / z)$ (3 marks)

(c) Distinguish between *boolean* and *character* literals as used in programming. (4 marks)

(d) Explain **three** error handling techniques used in C++. (6 marks)

3. (a) Outline **two** advantages of using functions in Object Oriented Programming. (2 marks)

(b) State **two** differences between *static* and *non-static* data members. (4 marks)

(c) The following is a C++ program segment. Use it to answer the questions that follow:

```
String.x="Information";
String.y="Communication".
```

Determine the out generated by each of the following functions:

(i) Cout << "x+y)";

(ii) Cout<< "(x.length ())";

(iii) Cout<< "(x.equals (y))"; (6 marks)

(d) (i) Define an *impure* function. (2 marks)

(ii) With the aid of syntax code explain how the member functions can be accessed using pointers. (6 marks)

4. (a) Explain *local variable* as used in object oriented programming. (2 marks)

(b) Distinguish between *encapsulation* and *abstraction* as used in C++. (4 marks)

(c) With the aid of a Syntax code explain inline function. (4 marks)

(d) (i) Define the term *enumerated datatype*. (2 marks)

(ii) Write a program in C++ that would initialize the values (20 50 40 10 30) into an array. The program then displays the sum, maximum and minimum of the values. (8 marks)

5. (a) Outline **four** characteristics of constructors as used in Object Oriented Programming. (4 marks)

(b) With the aid of a syntax code explain copy constructor. (4 marks)

(c) A C++ class has the name student with the following attributes:

Roll number: 5
Total Marks: 430
Age: 16

Write a C++ program to declare the class. (6 marks)



(d) The following code was written by a student. Use it to answer the questions that follow.

```
If(hours=40)
{
Cout<<"Full time";
}
Else if(hours<40)
{
Cout<<"Part time"
}
Else
{
Cout<<"Overtime due";
}
```

(i) Identify **three** bugs in the code. (3 marks)

(ii) Re-write the code correctly . (3 marks)

6. (a) Outline **three** differences between *overloading* and *overriding* as used in object oriented programming. (6 marks)

(b) Explain the term *compile time polymorphism*. (2 marks)

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(c) (i) Distinguish between *ifstream* and *ofstream* file operations. (4 marks)

(ii) Write a program in C++ to prompt a user to enter a figure (either a Circle or a Rectangle). The program then computes the area of the figure entered through a function and displays the result. (8 marks)

7. (a) Define each of the following terms as used in Object Oriented Programming:

(i) virtual function;

(ii) abstract class. (4 marks)

(b) Explain the term *object slicing* as applied in inheritance. (2 marks)

(c) Table 1 shows the criteria used to award bursaries to applicants .Use it to answer the question that follows.

| Credit score | Amount |
|---|---|
| 3 | 15,000 |
| 2 | 10,000 |
| 1 | 5,000 |
| 0 | 0 |

Table 1

Write a program in C++ that would prompt a user to enter the credit score of an applicant. The program then outputs the amount. Use case statement. (7 marks)

(d) Figure 1 shows a type of inheritance in C++. Use it to answer the questions that follow.



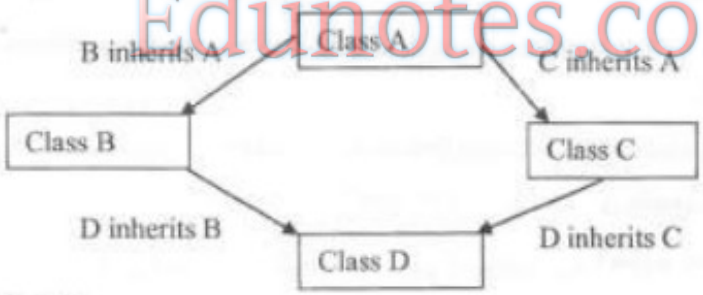


Figure 1

(i) Identify the type of inheritance depicted in the figure. (1 mark)

(ii) Describe the problem associated with this type of inheritance. (2 marks)

(iii) Explain **two** mechanisms that could be used to solve the problem in (ii) (4 marks)

(2 marks)

8. (a) Explain **two** types of exceptions in Object Oriented Programming. (4 marks)

(b) Describe *namespace* as used in C++ programming language. (2 marks)

(c) With the aid of a syntax code, explain the use of *break* and *continue* statements. (6 marks)

(d) Write a program in C++ to accept a string through the keyboard and store it in a file. (8 marks)

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