

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.**

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**Turn over**

1. (a) Define each of the following terms as used in Object Oriented Programming:
- (i) Object; (4 marks)
  - (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:
- $$(z = x^3 + y^2 - xy / z)$$
- (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)

- (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.

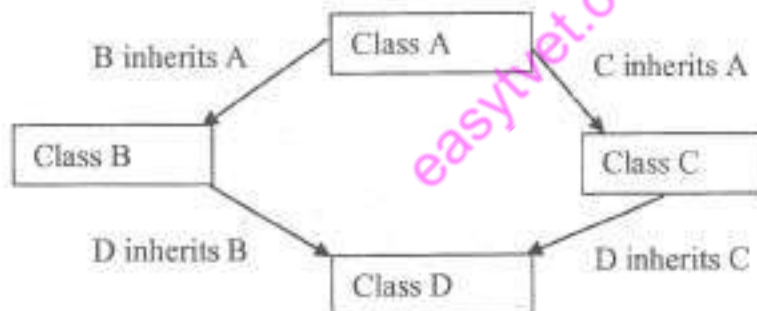


Figure 1

- (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)

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)

**THIS IS THE LAST PRINTED PAGE.**

*[Faint handwritten notes in pencil, possibly related to the questions above, including some code snippets and diagrams.]*

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