WORKFORCE DEVELOPMENT AUTHORITY

P.O. BOX 2707 Kigali. Rwanda Tel: (+250) 255113365

ADVANCED LEVEL NATIONAL EXAMINATIONS, 2016, TECHNICAL AND PROFESSIONAL STUDIES

EXAM TITLE: Algorithm and Programming

OPTIONS:

- **Computer Science (CSC)**

- **Computer Science and Management (CSM)**

DURATION: 3hours

INSTRUCTIONS:

The paper is composed of **three (3) main Sections** as follows:

Section I: Fifteen (15) compulsory questions.	**55 marks**
Section II: Attempt **any three (3)** out of five questions.	**30 marks**
Section III: Attempt **any one (1)** out of three questions.	**15 marks**

Note:

Every candidate is required to carefully comply with the above instructions. Penalty measures will be applied on their strict consideration.

CSC&CSM – Algorithm and Programming

T095

Thursday, 10/11/2016

08:30 – 11:30

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01. What is the function of an Operating System?   **3 marks**

02. What are the differences between machine languages and high-level languages?

                                                                         3 marks

03. Why do you need a compiler?   **3 marks**

04. Are the identifiers **firstName** and **FirstName** the same? Explain your answer. **3marks**

05. Write C++ statements to do the following:

    a.   Declare int variable **num1** and **num2**.   **1 mark**

    b.   Prompt the user to input two numbers.   **1 mark**

    c.   Input the first number in **num1**and the second number in **num2**.   **2 marks**

    d. Output **num1**, **num2**, and 2times **num1** minus **num2**. Your output must
       identify each number and the expression.   **2 marks**

06. What action must be taken before a variable can be used in a program?   **2 marks**

07. Which header file must be included to use the function **steprecision?**   **2 marks**

08. Which header file needs to be included in a program that uses the data types

   ifstream and **ofstream**?   **2 marks**

09. Explain the difference between the protected and public members of a class. **3 marks**

10. Draw the do-while and do-until flow charts.   **5 marks**

11. State and explain the four qualities of a good algorithm.   **5 marks**

12. What is the difference between a programme and a process?   **3 marks**

13. A program reads data from a file called **inputFile.dat** and, after doing some

   calculations, writes the results to a file called **outFile.dat**. Answer the following

   questions:

    a.   After the program executes, what are the contents of the file inputFile.dat?

    b.   After the program executes, what are the contents of the file **outFile.dat** if this file
       was empty before the program executed?

    c.   After the program executes, what are the contents of the file **outFile.dat** if this file
       contained 100 numbers before the program executed?

    d. What would happen if the file **outFile.dat** did not exist before the program
       executed?

                                                                         6 marks

Section II. Choose and answer any three (3) questions.   **30marks**

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16. Draw a flowchart to read four numbers a,b,c,d and calculate the average.   **10 marks**

17. Differentiate user defined functions and library functions.   **10 marks**

18. Read the code below and give its output.   **10 marks**

```
#include <iostream>
using namespace std;
int gVar1; // Global variables,
int gVar2 = 2;
int main()
{
char ch('A');
cout << "Value of gVar1: " << gVar1 << endl;
cout << "Value of gVar2: " << gVar2 << endl;
cout << "Character in ch: " << ch << endl;
int sum, number = 3;
sum = number + 5;
cout << "Value of sum: " << sum << endl;
return 0;
}
```

19. Create a program to calculate the area and the perimeter of a circle.   **10 marks**

20. Write a version of the sequential search algorithm that can be used to search a sorted list.   **10 marks**

Section III. Choose and answer any one (1) question.   **15 marks**

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21. Provide at least FIVE main advantages of using functions.   **15 marks**

22. Write a program allows entering 15 numbers and sorting them in ascending order, using arrays.   **15 marks**

23. A) Write a VB program to convert the Celsius temperature into Fahrenheit temperature.   **7.5 marks**

   B) Write a VB program to display the numbers which are multiple of 3 from 100 to 250.   **7.5 marks**