SOUTH EASTERN KENYA UNIVERSITY

UNIVERSITY EXAMINATIONS 2016/2017

SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE

IN COMPUTER SCIENCE

CSC121: PROGRAMMING AND PROBLEM- SOLVING

<u>DATE: 11TH APRIL, 2017</u>   <u>TIME: 1.30 -3.30 PM</u>

INSTRUCTIONS TO CANDIDATES

a) Answer <u>**ALL**</u> **questions from section A(Compulsory)**

b) Answer <u>**ANY TWO**</u> **questions from section B**

<u>SECTION A (30 Marks) - Compulsory</u>

Question One

a) Define the following terms: **[2 Marks]**

    i) Algorithm

    ii) Function overloading

b) Differentiate between   *pass by value* and *pass by reference* as used in C++.   **[2 Marks]**

c) Outline two advantages of using high-level language over low- level language.   **[2 Marks]**

d i) Analyze the code fragment shown below, and determine the output generated after its execution.   **[2 Marks]**

```
int found = 0, count = 5;
if (!found || count == 0)
cout << "Hatari" << endl;
cout << "count = " << count << endl;
```

    ii) Justify your answer in (i) above   **[1 Mark]**

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e i) Outline two rules for naming a variable. **[2 Marks]**

ii) With the help of an example in C++; explain the difference between local and global variables. **[3 Marks]**

f) Explain the meaning of the following escape sequence characters. **[2 Marks]**

    i) " \a "

    ii) " \n"

g) Write a C++ program, using *for* control structure that would vertically display odd numbers between 0 and 60 in descending order. **[4 Marks]**

h i) Draw a flowchart for a program that can be used to classify people according to age. If a person is more than 20 years, output "Adult" otherwise output "Young person". **[3 Marks]**

ii) Write a C++ program code that will implement the flowchart drawn in h(i) above. **[3 Marks]**

i) Write a program in C++ that prompts the user to enter the radius of a circle, then computes and displays the area and circumference of the circle. **[4 Marks]**

SECTION B (40 Marks): ANSWER ANY TWO QUESTIONS

Question Two

a i) Define the term pointer. **[1 Mark]**

ii) With the aid of example, explain how to define pointer variables in C++. **[4 Marks]**

b) Describe the hierarchy of C++ data types. **[6 Marks]**

c) Write a C++ program that prompts the user to enter two numbers, then calculates and displays the sum, product, difference, and modulus of those two numbers. **[4 Marks]**

d) Write a program in C++ that prompts the user to enter temperature in Fahrenheit, convert temperature given in degrees Fahrenheit to Celsius and then display the output on the screen.(hint: C = (F-32) * 5 / 9) **[5 Marks]**

Question Three

a) Outline four characteristics of a good computer program. **[4 Marks]**

b) Using examples, describe four categories of operators used in C++ language. **[4 Marks]**

c) Using a *switch case,* write a C++ program that prompts a user to enter student grade, the program should then display the remark as indicated in the table below. **[6 Marks]**

GRADE	REMARK
A	DISTINCTION
B	CREDIT
C	CREDIT
D	PASS
F	FAIL
ANY OTHER	INVALID GRADE

d) Write a C++ program that displays numbers that are divisible by nine between 1and 100.

[6 Marks]

Question Four

a) Explain the importance of stream classes in C++ programming. **[3 Marks]**

b) Study the code fragment shown below and answer the questions that follow.

```
int n, k = 5;

n = (100 % k ? k + 1 : k - 1);

cout << "n = " << n << " k = " << k << endl;
```

i) Construct a flowchart to depict the logic of the code fragment. **[3 Marks]**

ii) Determine the output generated when the following code fragment is executed. **[2 Marks]**

c) Functions play a very important role in any program.

    i) Explain the term function . **[2 Marks]**

    ii) Describe how to define and call a function. **[4 Marks]**

d) Write a C++ program that prompts the user to enter three numbers, then finds out and displays

the largest number of the three numbers entered. **[6 Marks]**

END