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**GARISSA UNIVERSITY**

**UNIVERSITY EXAMINATION 2019/2020 ACADEMIC YEAR TWO**

**SECOND SEMESTER EXAMINATION**

**SCHOOL OF INFORMATION SCIENCE AND TECHNOLOGY**

**FOR THE DEGREE OF BACHELOR OF INFORMATION SCIENCE**

**COURSE CODE: COM 210**

**COURSE TITLE: PROCEDURAL PROGRAMMING II**

**EXAMINATION DURATION: 2 HOURS**

**DATE: 14/02/2020 TIME: 2.00-4.00 PM**

**INSTRUCTION TO CANDIDATES**

* **The examination has FIVE (5) questions**
* **Question ONE (1) is COMPULSORY**
* **Choose any other TWO (2) questions from the remaining FOUR (4) questions**
* **Use sketch diagrams to illustrate your answer whenever necessary**
* **Do not carry mobile phones or any other written materials in examination room**
* **Do not write on this paper**

**This paper consists of THREE (3) printed pages *please turn over***

**QUESTION ONE (COMPULSORY)**

1. Define the following terms as used in computer programming
   1. Program
   2. Software
   3. CPU
   4. Pointer **[4 marks]**
2. Differentiate between relational and arithmetic operators  **[4 marks]**
3. What is a pre-compiler directive? Use a C++ example **[2 marks]**
4. Write C++ statements that check whether an integer mark is greater than or equal to 40 and displays “Pass”, if true and “Fail” if false **[4 marks]**
5. State any two types of errors that can be found in a program **[2 marks]**
6. Write a C++ program that prompts the user to enter an employees’ number of hours worked in a week and calculates the gross pay based on the following requirements:
   * 1. The employee is paid at hourly rate of Kshs 200 subject to maximum hours of 40.
     2. If the employee works for more than 40 hours, he/she is entitled to an overtime pay of 1.5 times the hourly rate.
7. Write a C++ function to find the factorial of a number N. **[4 marks]**

**QUESTION 2**

1. Differentiate between a structure and an array and illustrate the appropriate syntax for defining each.  **[6 marks]**
2. Explain the concept of templates. Differentiate between function and class templates **[4 marks]**
3. Explain the term namespace **[4 marks]**
4. Describe three types of loop constructs in C++ **[6 marks]**

**QUESTION 3**

1. Using a syntax code and simple diagram show an example of an inheritance hierarchy for different types of bank accounts (Savings, Current and Investment). **[8 marks]**
2. The following formula can be used to determine the distance an object falls due to gravity in a specific time period:

d = 1⁄2 gt2

The variables in the formula are as follows: d is the distance in meters, g is 9.8, and t is the time in seconds that the object has been falling.

1. Write a function named falling Distance that accepts an object’s falling time (in seconds) as an argument. The function should return the distance, in meters, that the object has fallen during that time interval. **[5 marks]**
2. Write a program that demonstrates the function by calling it in a loop that passes the values 1 through 10 as arguments, and displays the return value. **[7 marks]**

**QUESTION 4**

1. Write the prototype and header for a function called compute. The function should have three parameters: an int, a double, and a long (not necessarily in that order). The int parameter should have a default argument of 5, and the long parameter should have a default argument of 65536. The double parameter should not have a default argument. **[5 marks]**
2. Write a do-while loop that asks the user to enter two numbers. The numbers should be added and the sum displayed. The user should be asked if he or she wishes to perform the operation again. If so, the loop should repeat; otherwise it should terminate **[5 marks]**
3. Write one or more C++ statements that assign the correct value to discount, using the logic described here:

Assign .20 to discount if dept equals 5 and price is $100 or more.

Assign .15 to discount if dept is anything else and price is $100 or more.

Assign .10 to discount if dept equals 5 and price is less than $100.

Assign .05 to discount if dept is anything else and price is less than $100. **[10 marks]**

**QUESTION FIVE**

* 1. Develop an algorithm and a flow chart that can be used to swap two variables **[5 marks]**
  2. Write a C++ function for the above algorithm **[10 marks]**
  3. Suppose you want to write a for loop that displays “I love to program” 50 times. Assume that you will use a counter variable named count.
  4. What initialization expression will you use? **[1 mark]**
  5. What test expression will you use? **[1 mark]**
  6. What update expression will you use? **[1 mark]**
  7. Write the loop. **[3 marks]**