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# Mount Kenya University

**UNIVERSITY EXAMINATION 2019/2020**

**SCHOOL OF COMPUTING AND INFORMATICS**
**DEPARTMENT OF INFORMATION TECHNOLOGY**

**BACHELOR OF INFORMATION TECHNOLOGY**

**REGULAR**

***UNIT CODE: BIT3106*** ***UNIT TITLE: OBJECT ORIENTED PROGRAMMING I***

***DATE: DECEMBER, 2019*** ***MAIN EXAM*** ***TIME: 2 HOURS***

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**INSTRUCTIONS:**
**ANSWER ALL QUESTIONS IN SECTION A AND ANY OTHER TWO QUESTIONS IN SECTION B**

**SECTION A**

**QUESTION 1 (30 MARKS)**

a) Explain how Object Oriented Programming differ from Procedural Programming? (4 Marks)

b) Explain the types of variable as used in C++ programming language (6 Marks)

c) Using a C++ program, Show the two ways in which constants are declared (6 Marks)

d) Write a C++ program that stores the integers 0 through 4 in an array. It then outputs the contents of the array elements in reverse order. Use a **for** loop. (6 Marks)

e) Explain the term *class* as used in Object Oriented Programming. (4 Marks)

f) Define the following terms as used in Object Oriented Programming:

i) Polymorphism (4 Marks)

ii) Inheritance

**QUESTION 2 (20 MARKS)**

a) Give any **five** reasons for adopting Object Oriented Programming in program development. (5 Marks)

b) With the use of appropriate sketches, demonstrate *inheritance* as used in Object Oriented Programming. (5 Marks)

c) Using the loops and conditional statement write a java program to display the following (10 Marks)

**1**
**2 3**
**4 5 6**
**7 8 9 10**

**QUESTION 3 (20 MARKS)**

a) Explain each of the following terms as used in Object Oriented Programming languages:

i) Abstract class. (3 Marks)

ii) Size of. (3 Marks)

b) What is a control structure in programming? (4 Marks)

i. Design and write a java program that allow the user to enter the mass(in kg) and Height( in metres), the program then compute the **body mass index (BMI)** of patient in hospital and output appropriate interpretation using the following table. (10 Marks)

Note

The formular is

$$\text{BMI} = \frac{\text{mass(kg)}}{(\text{height(m)})^2}$$

| BMI RANGE-kg/m$^2$ | interpretation |
|---|---|
| less than 15 | Very severely underweight |
| from 15.0 but less than 16.0 | Severely underweight |
| from 16.0 but less than 18.5 | Underweight |
| from 18.5 but less than 25.0 | Normal (healthy weight) |
| from 25.0 but less than 30.0 | Overweight |
| over 30 | Obese |

**QUESTION 4 (20 MARKS)**

a) *Define the term identifier and state any three rules to follow when naming an identifier.* (4 Marks)

b) Using appropriate examples differentiate between the following as used in object oriented programming:

i)

ii) A class and an objec

iii) A local and a global variable (6 Marks)

c) A salesman for an insurance company earns a basic salary, a house allowance and a commission of 5% for each policy sold. The basic salary is taxed at a rate of 30% and the commission is taxed at a rate of 8.5%. Design an algorithm and write a C program that will accept the basic salary, the house allowance and the total policies sold by a salesman, the solution should determine and output the gross pay, total tax deductions and the net pay. (10 Marks)

**QUESTION 5 (20 MARKS)**

a) Write a C++ program using for loop that will display integers 1 through 20 in descending order. (10 Marks)

b) Write a C++ program that requests a student's age from the user. The program should accept positive age only. If the user enters a negative number, the program should throw an exception, and display a string or message. (10 Marks)