# Machakos University

**University Examinations 2017/2018 Academic year**

SUPPLEMENTARY/SPECIAL EXAMINATIONS

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

**SECOND SEMESTER EXAMINATION FOR THE DIPLOMA OF INFORMATION AND COMMUNICATION TECHNOLOGY**

**DIT 109: OBJECT ORIENTED PROGRAMMING 1**

Date: 29/8/2018 Time: 2:00-4:00 PM

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**Instructions**
This Paper consists of FIVE questions
Answer question ONE and any other TWO questions in this paper

1 a) Distinguish between the following terms as used in *Object Oriented programming*

i) Encapsulation and abstraction.

ii) Polymorphism and Inheritance

iii) Object and Class. (6 marks)

b) Outline any **four** characteristics of destructors (4 marks)

c) Explain the different **access modifiers** in a *Class definition.* (6 marks)

d) Explain any **two** operators used in C++ programming. (2 marks)

e) Giving an example, explain the purpose of the scope(::) operator (4 marks)

f) Write a C++ program that will implement a class containing the dimensions of *right angled triangle* (base and height) and a *parameterized constructor* to initialize the dimension as **12cm** and **5cm** respectively. The program should the determine the *length* of the **3rd** side through the use of a function and output it. (6 marks)

g) Explain the meaning of the *friend* declaration (2 marks)

2 a) In recent army recruitment, recruits were manually admitted to KDF based on the following criteria;

i. Height should be not less than 5.4 feet
ii. Weight should not be less than 55 kg
iii. And they should be Kenyan citizens aged 18 and above
iv. Have no criminal record

If none of these criteria is met, they are sent back and told to try again next time. i.e. "Not Qualified, Try Next Time" and if ALL the criteria is met, "Congratulations, Welcome to the Kenya Defense Forces". As a computer programmer, write the code to in C++ to actualize the process (8 marks)

b) Write a C++ program that accepts the *length* and *width* of a rectangle piece of land in feet, *converts* them into *meters* and calculates the area. The program should then output the length, width and area in meters. Use a function.
*Hint 1 foot=0.3 meters and area =length * width* (6 marks)

d) Distinguish between *function declaration* and *function definition* as applied in C++ programming language. (4 marks)

e) List any **four** advantages of functions (2 marks)

3 a) Write a C++ program that will prompt the user to enter **five** marks for **five** Subjects using the keyboard. It should then calculate the average of the five Subjects and award the appropriate grade using the following grading system

| AVERAGE | GRADE |
|---|---|
| >= 75 | A |
| >= 60 | B |
| >= 50 | C |
| >= 40 | D |
| <40 | E |

All the subject marks should be above **zero** and less or equal to **100**. If the User enter a value that is not within this rage then the program should not calculate The average but should display an error message. (7 mrks)

b) Explain any **three** qualities of a good program (3 marks)

c) Write a C++ program that uses an *array* to store **ten** values. The program should then print out the numbers in *reverse*. (6 marks)

d) Explain the meaning of the term *Array* as used in C++. (2 marks)

e) Explain the meaning of the term *control flow* as used in C++ programming giving an example. (2 marks)

4 a) Write a C++ program that will display all the even numbers from 0 to 10. Use the **For** loop and the **If** statement. (4 marks)

b) Write a C++ program to implement three instances of a structure with the Following specifications:

- The details to be stored in the structure:
  - Name
  - Department
  - salary
- The operations on the structure:
  - Inputting the details
  - Outputting the details

The structure should capture information of ten employees. (4 mrks)

b) Write a C++ program that will accept the purchase amount of a commodity

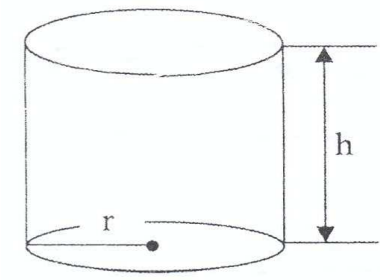
and then calculate the payable amount using the information bellow

| **Purchase Amout** | **Discount** |
|---|---|
| >=10000 | 10% |
| >=5000 | 5% |
| >=2500 | 2% |
| <2500 | 0% |

*Hint:*

*Payable amount=purchase amount-(discount*purchase amount)* (6 marks)

c) The figure below shows an open cylinder. Write a C++ program that will implement a class name cylinder with the appropriate dimensions only. The program should determine and output the volume of the cylinder.
***Hint: Volume=$\pi r^2 h$*** (6 marks)




5 a) Explain any **three** applications areas of **OOP**. (3 marks)

b) Explain any three types of inheritance (6 marks)

c) Distinguish between the following:

i. Enumerator and structure

ii. Constructor and destructor (4 marks)

d) The following are the properties of a base class used by students during a C++ Programming lesson:

- Marks of three subjects as data members;
- Function member to accept the marks in the three subjects

Write a C++ program that will implement five instances of a subclass of the base Class. The program should determine and output the *average marks* in the three Subject through the use of a member function (7 marks)