



MACHAKOS UNIVERSITY

University Examinations for 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FIRST YEAR SECOND SEMESTER EXAMINATION FOR

DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY

DIT 105: OBJECT ORIENTED PROGRAMMING I

DATE: 26/9/2019

TIME: 8.30-10.30 AM

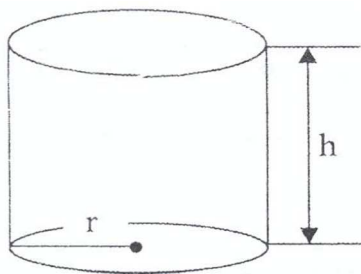
INSTRUCTIONS

Answer **question ONE** and any other **TWO** questions.

QUESTION ONE (30 MARKS)

- 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 Constructors (4 marks)
- c) Explain the different **access modifiers** in a *Class definition*. (6 marks)
- d) Explain the meaning of the term *Jump* as used in C++ programming. (2 marks)
- e) Giving an example, explain the purpose of the scope(::) operator (4 marks)
- f) 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)



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

QUESTION TWO (20 MARKS)

- a) 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 then determine the *length* of the **3rd** side through the use of a function and output it. (6 marks)
- b) Write a C++ program that will accept the purchase amount of a commodity and then calculate the payable amount using the information bellow

<u>Purchase Amout</u>	<u>Discount</u>
i. ≥ 10000	10%
ii. ≥ 5000	5%
iii. ≥ 2500	2%
iv. < 2500	0%

Hint:

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

- c) List any **four** advantages of functions (2 marks)
- d) Explain any **two** operators used in C++ programming. (4 marks)
- e) Explain the meaning of *control flow* as used in C++ programming. (2 marks)

QUESTION THREE (20 MARKS)

- a) 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. (7 marks)

- b) Explain the methods of *initializing* an Array. (4 marks)
- c) Explain any **four** advantages of a function. (4 marks)
- d) Bata shoe Company is offering a 30% discount for every purchase of the second pair of shoe which is of equally or lesser value than the first pair. Write a pseudo code to represent the scenario (5 marks)

QUESTION FOUR (20 MARKS)

- a) Explain the different *scopes of variables* in C++ programming. (6 marks)
- b) Write a C++ program that will prompt the user to enter their **two** names using an *Array* and then display them. (6 marks)
- c) Write a C++ program that will prompt the user to enter a number. The Program then determines the *square root* of the number though a *built-in* Function and displays the result on the screen. (6 marks)
- d) Explain any **two** qualities of a good program (2 marks)

QUESTION FIVE (20 MARKS)

- 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 (6 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)

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

d) Explain the output of the following snippet code (4 marks)

```
#include <iostream>
using namespace std;
class CRectangle {
    int width, height;
public:
    CRectangle (int,int);
    int area () {return (width*height);}
};
CRectangle::CRectangle (int a, int b) {
    width = a;
    height = b;
}
int main () {
    CRectangle rect (3,4);
    CRectangle rectb (5,6);
    CRectangle rectc(7,7);
    cout << "rect area: " << rect.area() << endl;
    cout << "rectb area: " << rectb.area() << endl;
    cout << "rectc area: " << rectc.area() << endl;
    return 0;
}
```