MACHAKOS UNIVERSITY

University Examinations for 2020/2021 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

SECOND YEAR SECOND TERM EXAMINATION FOR

DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY

OBJECT ORIENTED PROGRAMMING

DATE: 4/6/2021   **TIME:8.30-11.30 AM**
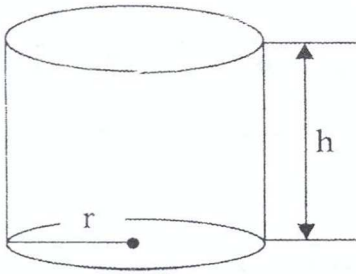
INSTRUCTIONS

Answer question one and any other two question

QUESTION ONE

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

　　　i)   Encapsulation and abstraction.

　　　ii)   Polymorphism and Inheritance

　　　iii)   Object and Class.   (3 marks)

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

c)   Explain the different **access modifiers** in a *Classdefinition.*   (3 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   (2 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=$\pi r^2 h$ (4 marks)

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

QUESTION TWO

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

	Purchase Amout	**Discount**
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

a) Write a C++ program to implement three instances of a structure with the

Following specifications:

- o The details to be stored in the structure:
  - – Name
  - – Department
  - – salary

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        o   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 shoes which is of equally or lesser value than the first pair. Write a pseudo code to represent the scenario   (5 marks)

QUESTION FOUR

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. TheProgram 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

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 ofland in feet, *converts* them into *meters* and calculates the area. The programshould 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 appliedin C++ programming language. (4 marks)

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

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

QUESTION SIX

Write a C++ program that will prompt the user to enter the *date and year*. The year should not be greater than 2020 and not less than 1900 otherwise an error message should be displayed. The date includes day and month. The program should also check if the day entered is equal to the number of days in that particular month, if not so the program should then display an *error* message that the date is invalid otherwise it should display the *date and year*. (20 marks)

QUESTION SEVEN

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 will use an array to accept five values and then print them in reverse   **(6 marks)**

c)   Outline any **four** characteristics of Constructors   **(4 marks)**

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

QUESTION SEVEN

a)   Write a C++ *function* that will calculate the area of a circle, and then demonstrate how the function is *called*.   **(6 marks)**

b)   Explain the methods of *initializing* an Array.   **(4 marks)**

c)   Write a C++ program that will accept a *number* n and display *sum of series* from one to n eg 1+1/2+1/3+1……….∕n+1.   **(4 marks)**

d)   Explain the meaning of the following terms as used in C++ programming

      i.   Source code.

      ii.   Object code.

      iii.   Executable code.

      iv.   Pseudo code.   **(4 marks)**

e)   C++ is a *strongly typed* programming language. Explain the reason why.   **(2 marks)**