UGANDA MARTYRS UNIVERSITY

FACULTY OF SCIENCE
DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION SYSTEMS

END OF SEMESTER FINAL ASESSMENT

SEMESTER I, 2023/2024

FIRST YEAR EXAMINATION FOR BACHELOR OF SCIENCE INFORMATION TECHNOLOGY, BACHELOR OF SCIENCE EDUCATION

PRINCIPLES OF PROGRAMMING

COURSE CODE: CSC 1104

DATE:
TIME:
DURATION: 3 Hours

Instructions:

1. Carefully read through ALL the questions before attempting
2. Section A is compulsory. Also, attempt any three questions from Section B.
3. No **names** should be written anywhere on the examination book.
4. Ensure that your **Registration Number** is indicated on all pages of the examination answer booklet.
5. Ensure your work is **clear** and **readable**. Untidy work shall be penalized.
6. Any type of examination Malpractice will lead to automatic disqualification.
7. Do not write anything on the question paper.

SECTION A (40 Marks)

Write a letter corresponding to the correct answer. (E.g. **1. a)** *Each question carries two (2) marks.*

1. Which of the following is an object oriented programming language?

a) C

b) FORTRAN

c) C++

d) BASIC

2. What does a class in programming hold?

a) data

b) functions

c) both data & functions

d) none of the mentioned

3. Which of the following is a valid class declaration?

a) class A { int x; };

b) class B { }

c) public class A { }

d) object A { int x; };

4. Given *int a = 2;*, what does *cout<<a++;* output?

a) 3

b) 2

c) 4

d) none of the mentioned

5. To make large programs more manageable programmers modularize them into subprograms that are called

a) Operators

b) Classes

c) Functions

d) None of them

6. Which header file is required for displaying information on the screen?

a) math.h

b) string.h

c) conio.h

d) iostream.h

7. Which of the following statements has a syntax error

a) int x;

b) Student peter;

c) cout"How are you?";

d) return 0;

8. From the following, which is used for invoking a function?

a) call-by-reference

b) call-by-value

c) call-by-functions

d) Both A and B

9. All variables declared in a function definition are called

a) Protected variables

b) Local variable

c) Global Variables

d) Private variable

10. Which of the following is an assignment operator

a) ==

b) =

c) +

d) /

11. A function that need no return value, is called:

a) infinite function

b) finite function

c) void function

d) All of them

12. Debugging refers to:

a) Removing bugs from a chair

b) Removing errors from a program

c) All the above

d) None of the above

13. Which of the following is used for single line comments?

a) // comment

b) /* comment */

c) $ comment

d) None of the above

14. Flowcharts and pseudo codes are forms of:

a) comments

b) programing languages

c) algorithms

d) problems

15. A loop that terminates at some point is called:

a) finite loop

b) infinite loop

c) for loop

d) while loop

16. What would be the output from the following operation (23 % 10):

a) 230

b) 0

c) 2310

d) 3

17. Given *int num=10;*, what would *cout<<"Num "<<"num";* display?

a) cout<<"Num"<<"num";

b) Num 10

c) Num10

d) Num num

18. Which of the following is not an editor for C++ programs?

a) Notepad

b) Borland C++

c) Ms Word

d) Dev C++

19. Which one of the following is a source code file?

a) test.cpp

b) test.exe

c) all the above

d) none of the above

20. Which of the following is an object oriented programming concept?

a) function

b) inheritance

c) loop

d) variable

Question 1 (20 marks)

a) Explain any two real life problems that can be solved using programming. **[5 marks]**

b) Write short notes on the following:

    i. Algorithm   **[3 marks]**

    ii. Loops   **[3 marks]**

    iii. public   **[3 marks]**

    iv. Syntax   **[3 marks]**

    v. void   **[3 marks]**

Question 2 (20 marks)

a) Explain the following in relation to object oriented programming:

    i. Inheritance.   **[3 marks]**

    ii. Polymorphism   **[3 marks]**

    iii. Encapsulation   **[3 marks]**

    iv. Abstraction   **[3 marks]**

b) Describe the structure of a C++ program using a suitable example.   **[8 marks]**

Question 3 (20 marks)

a) Explain any two real life scenarios that would require using the *if statement*. **[6 marks]**

b) Why are comments important in computer programming?   **[2 marks]**

c) What are data types? Explain any two data types in C++.   **[4 marks]**

d) Differentiate between *a while* and *a for* loop.   **[6 marks]**

e) In declaring a function, a return type is specified. Explain its significance?   **[2 marks]**

Question 4 (20 marks)

Study the C++ code below and answer the questions that follow:

```cpp
class Shape
{
        float length;
        float width;
        float height;

        public:
            float area(float L, float W)
            {
                    float A;
                    lenght = L;
                    width = W;
                    A = L*W;
                    return A;
            }
        float area(float R)
        {
                float A;
```

```
            A = 3.14 * R*R;
            return A;
        }
};


    void main()
    {
        Shape Rectangle;
        Shape Circle;
        cout<<"Area of Circle ="<<Circle.area(10)<<endl;
        cout<<"Area of Rectangle="<<Rectangle.area(5,6);
        getche();
    }
```

a) Explain how encapsulation is demonstrated in the C++ code above.   [5 marks]
b) What would be the output of the above C++ code.   [4 marks]
c) What is the significance of the public access control in the C++ code above   [3 marks]
d) Why is the main function stated as void in the code above?   [3 marks]
e) Explain the meaning of *float area (float L, float W)* as used in the code above. [5 marks]

Question 5 (20 marks)

a) A hardware shop wishes to institute a computerized system to manage the sale of its products. When a sale is processed, details Item Name, Price and Quantity are captured. These particulars are used to compute total cost of products and total receipt from the sales made. Write a C++ class to implement the above user requirements.   [10 marks]

b) Create objects of three products which are sold in the hardware shop.   [5 marks]

c) Process the sale of the three products above.   [5 marks]

Question 6 (20 marks)

a) The following code snippet contains bugs. Study it carefully and rewrite it without leaving any bugs. [5 marks]

```
// A program  to print out the first 10 counting numbers
#include<iostreams>
using namespace std;
int main()
{
    cout>>"Printing the first 10 counting numbers.\n";
    int num = 1;
    while(num == 5)
    {
        cout<<num<<"\n";
    }
}
```

b) (i) Given the following C++ program, determine the output. [*3 marks*]

```cpp
#include <iostream>
int main()
{

    int num1 = 3, num2 = 5;
    std::cout<<"The sum is "<<num1+num2<<"\n";
    std::cout<<"This is different from "<<"num1 + num2";
    std::cout<<"\"\nTricky, right? \"";
    return 0;
}
```

(ii) Given the following C++ code snippet, determine the final value of result. [*2 marks*]

```cpp
int a = 10;
int b = 3;
int result = a / b + a % b;
```

c) Consider a scenario where you need to create a program to *calculate the product of three numbers gotten from the user.*

   i.   Write a pseudocode algorithm to achieve this task. [*3 marks*]

  ii.   Design a flowchart for the above scenario. [*3 marks*]

 iii.   Write the C++ code to implement the above program. [*4 marks*]

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