UNIVERSITY EXAMINATIONS

EXAMINATION FOR JANUARY/APRIL 2023/2024 FOR DIPLOMA IN COMPUTER SCIENCE/DIPLOMA IN BUSINESS INFORMATION TECHNOLOGY/ DIPLOMA IN INFORMATION TECHNOLOGY

RCS 013: INTRODUCTION TO COMPUTER PROGRAMMING

DATE: April 2024 TIME: 2 HOURS

GENERAL INSTRUCTIONS:

Students are NOT permitted to write on the examination paper during examination time.

This is a closed book examination. Text book/Reference books/notes are not permitted.

SPECIAL INSTRUCTIONS:

This examination paper consists Questions in Section A followed by section B.

Answer **Question 1 and any Other Two** questions.

QUESTIONS in ALL Sections should be answered in answer booklet(s).

1. **PLEASE start the answer to EACH question on a NEW PAGE.**
2. **Keep your phone(s) switched off at the front of the examination room.**
3. **Keep ALL bags and caps at the front of the examination room and DO NOT refer to ANY unauthorized material before or during the course of the examination.**
4. **ALWAYS show your working.**
5. **Marks indicated in parenthesis i.e. ( ) will be awarded for clear and logical answers.**
6. **Write your REGISTRATION No. clearly on the answer booklet(s).**
7. **For the Questions, write the number of the question on the answer booklet(s) in the order you answered them.**
8. **DO NOT use your PHONE as a CALCULATOR.**
9. **YOU are ONLY ALLOWED to leave the exam room 30minutes to the end of the Exam.**
10. **DO NOT write on the QUESTION PAPER. Use the back of your BOOKLET for any calculations or rough work.**

SECTION A (COMPULSORY-ANSWER ALL QUESTIONS)

Question One (30marks)

a. Identify the parts of the program as numbered 1,2,3and 32 and state the purpose of each.

(8marks)

```
1. #include <iostream>
2. using namespace std;
3. int main( )
4. {
5. char operation;
6. double num1, num2;
7. cout << "Enter an operator (+, -, *, /): ";
8. cin >> operation;
9. cout << "Enter two numbers: ";
10. cin >> num1 >> num2;
11. switch(operation) {
12. case '+': cout << num1 << " + " << num2 << " = " << num1 + num2;
13. break;
14. case '-': cout << num1 << " - " << num2 << " = " << num1 - num2;
15. break;
16. case '*': cout << num1 << " * " << num2 << " = " << num1 * num2;
17. break;
18. case '/':
19. if (num2 != 0)
20. {
21. cout << num1 << " / " << num2 << " = " << num1 / num2;
22. }
23. else
24. {
25. cout << "Error! Division by zero is not allowed.";
26. }
27. break;
```

```
28. default:
29. {
30. cout << "Error! Invalid operator.";
31. }
32. return 0;
33. }
```

b. State any three variables used in programming. **(3marks)**

c. Outline why it is important to have data types in any program during declarations of memory spaces. Give one example used in the program to demonstrate your understanding. **(2marks)**

d. Explain the purpose of the program above.Use an example from the program to demonstrate your understanding. **(4marks)**

e. Identify any headerfile used in the program and state its purpose. **(3marks)**

f. Explain the purpose of cout,cin,default and break as used in the program. **(4marks)**

g. Convert the portion of the program from line 11 to 31 to use a nested if-elseif . **(6marks)**

SECTION B (ANSWER ANY TWO QUESTIONS)

Question Two (15 marks)

a. Identify 10 similarities between c and c++ programming. **(10 marks)**

b. Study the portion of a program below and answer the questions that follow.

```
1. int main(){
2. int scores [5]={70,60,50,58,68,};
3. cout<< scores [2][3];
4. return 0;
5. }
```

i. Explain what will happens to line 3 in the program. **(2 marks)**

ii. Write a program that displays all elements in the array above **(3 marks)**

Question Three (15 marks)

a. The following is a C++ program. Use it to answer the questions that follow.

```
1.  #include <iostream>
2.  using namespace std;
3.  class BankAccount {
4.  private:
5.  string accountHolderName;
6.  double balance;
7.  public:
8.  // Constructor
9.  BankAccount(string name, double initialBalance) {
10. accountHolderName = name;
11. balance = initialBalance;
12. }
13. void deposit(double amount)
14. {
15. balance += amount;
16. cout << "Deposit of $" << amount << " successful.\n";
17. }
18. void withdraw(double amount) {
19. if (amount <= balance) {
20. balance -= amount;
21. cout << "Withdrawal of $" << amount << " successful.\n";
22. }
23.  else {
24. cout << "Insufficient funds. Withdrawal failed.\n";
25. }
26. }
```

```
27. void displayBalance( ) {
28. cout << "Current balance for " << accountHolderName << ": $" << balance << endl;
29. }
30. };
31. int main( ) {
32. BankAccount myAccount("John Doe", 1000.0);
33.  myAccount.deposit(500.0);
34. myAccount.displayBalance( );
35. return 0;
36. }
```

i. Identify the following:

a) Name of the class **(1 mark)**

b) State two user defined functions used in the program with their purpose. **(6marks)**

c) The purpose of a constructor in the program **(2marks)**

d) Two instance variables. **(2marks)**

e) Two access modifiers used in the program **(2 marks)**

f) Outline the output of the program **(2marks)**

Question Four (15 Marks)

a. State whether the following is a Keyword, variable or invalid. **(10marks)**

i. cout

ii. final

iii. protected

iv. class

v. total$marks

vi. program_flow

vii. totals.

viii. Total-Marks

ix. 123string

b. Assuming that x is 4 show the result of the following Boolean expressions.

(5marks)

i. (true) && (10 > 4)

ii. (x > 0) | | (x < 0)

iii. (x != 1) = = !(x = = 1)

iv. (x != 0) | | (x == 0)

v. !(x > 0) && (x > 0)

Question Five (15 marks)

a. State whether the statement below are True or False. In each give a reason for your answer.

1. Reserved words can be used as variables in a program. **(1mark)**
2. The default case is required in the switch selection statement. **(1mark)**
3. The expression (x > y && a < b) is true if either the expression x > y is true or the expression a < b is true. **(1mark)**
4. ++ **and** + are the same in programming. **(1mark)**
5. C++ considers the variables number and NuMbEr to be identical. **(1mark)**
6. = and = = are the same in programming. **(1mark)**
7. The break statement is required in the default case of a switch selection statement to exit the switch properly. **(1mark)**
8. An expression containing the || operator is true if either or both of its operands are true. **(1mark)**
9. When a variable uses float or double datatype, the memory location can accept decimal values. **(1mark)**
10. All variables must be declared before they're used. **(1mark)**
11. All variables must be given a type when they're declared. **(1mark)**
12. All preprocessor directives must begin with #. **(1mark)**

b. Below is a snippet of a program. Use it to answer the questions that follow

```
int sum = 0;
int number;
cout<<"Enter an integer";
```

```
cin>>number;
while (number != -1)
{
sum += number;
cout<<"Enter an integer " ;
cin>> number;
}
```

i. State the purpose of the portion of the program. **(2 marks)**

ii. How many times will the program loop **(1 mark)**