Student Name :

Student ID :

Student Seat Number :

Time Allowed : **60 minutes**

Question 1: What is the output of the following program? **(1 x 6 *marks*).**

(1)
```
int b = 3;
b<0?b++:--b;
cout << "b is \"" << 'b' << "\"";
```

(2)
```
int a = 13.8;
cout<< a/3;
```

(3)
```
int a=0, b=0;
a = (a = 2) + (b = 3);
cout<< a;
```

(4)
```
int a, b, c;
c = (a=3) &&  (b=4);
c = (a=0) && (b=5);
c = a || (b=6);
c = (a=2) || (b=7);
cout<<b;
```

(5)
```
int x=4;
if (x!=4);
      x=2;
cout << x;
```

(6)
```
int a=3,b=0;
if (a=1)
      if (b=1)
            cout <<4;
else
      cout <<5;
      cout <<6;
```

Your Answers:

(1) b is “b"			(2) 4
(3) 5	(4) 6	(5) 2	(6) 46

Question 2: Multiple-Choice Questions (Select exactly ONE choice for each question). (**0.5 x 4 *marks***).

1) What is the largest integer value that can be represented by an **int** variable?

(A) 2^{32} **(B)** 2^{31} **(C)** $2^{31} - 1$ **(D)** $2^{32} - 1$

2) What is output of the following code: cout<< (char)(‘a' + 1) ?

(A) 98 **(B)** b **(C)** 255 **(D)** a

3) What is output of the following code: cout<<1/5 ?

(A) 0.2 **(B)** 1 **(C)** 0 **(D)** 5

4) Let x denote a variable, what is the correct C++ expression for the following description: “x is smaller than or equal to 0 and x is larger than -256”?

(A) -256 < x & x < =0 **(B)** -256 < x <= 0 **(C)** x> -256 | x <= 0 **(D)** x<=0 && x > -256

Your Answers:

1) C	(2) B	(3) C	(4) D

Question 3: The following program outputs the **bigger** user input. Some code contains syntax errors. Write the correct codes in the right column. Marks will be deduced for incorrect attempts. **(4 *marks*).**

Line number	Program Code	Correct Code
1	include <iostream>	#include <iostream> //0.5
2	using namespace std	using namespace std; //0.5
3	void main	void main() //0.5
4	{	
5	int a; b; c;	int a, b, c;//0.5
6	cin << a << b;	cin >> a >> b;//0.5
7	c = (a <= b) ? b , a;	c = (a <= b) ? b : a;//0.5 mark
8	cout c >> end;	cout << z << endl; //0.5+0.5 mark
9	}	

Question 4 (**4 *marks***).

Complete the following program that reads in a year and checks whether the year entered by the user is leap year or not. All years which are perfectly divisible by 4 are leap years, except for century years (years ending with 00) which is leap year only if it is perfectly divisible by 400 (e.g., 2000 and 1600). A sample output of your program is as follows.

```
Please enter a year: 1900
1900 is not a leap year.
```

```
#include <iostream>
using namespace std;
void main() {
    int year; bool flag = false;
    cout << "Please enter a year: ";
    cin >> year;
    if (year % 4 == 0) {                    // 1 mark
        if (year % 100 == 0) {              // 1 mark
            if (year % 400 == 0) {          // 1 mark
                flag = true;
            }
        } else {                            // 1 mark
            flag = true;
        }
    }
    if (flag) {
        cout << year << " is a leap year.";
    } else {
        cout << year << " is not a leap year.";
    }
}
```

Question 5 (**4 marks**).

Complete the following program that reads in the number of **millimeters** and converts it to **meters**, **centimeters** and **millimeters**. A sample output of your program is as follows.

```
Please enter the number of millimeters:  12306
12306 millimeter(s)  = 12 meter(s) 30 centimeter(s) 6 millimeter(s)
```

```
#include <iostream>
using namespace std;

void main() {

    int m, cm, mm, input; // m is meter, cm is centimeter, mm is millimeter

    cout << "Please enter the number of millimeters: ";

    cin >> input;









    cm = input / 10;     // 1 mark
    m = cm / 100;        // 1 mark
    cm %= 100;           // 1 mark
    mm = input % 10;  // 1 mark









    cout << input << " millimeter(s) = " <<m<< " meter(s) "<<cm<<" centimeter(s) "<<mm<<" millimeter(s)";
}
```

Question 6 (***Bonus, 4 marks***).

Write a program that generates a Fibonacci sequence. A Fibonacci sequence of n numbers, where n is greater than 1, is defined as follows: the first two numbers in the sequence are 0 and 1, and the other numbers are simply the sum of its preceding two neighbors.

For example, a Fibonacci sequence of 2 numbers is simply {0,1}; a Fibonacci sequence of 4 numbers is {0,1,1,2}; a Fibonacci sequence of 10 numbers is {0,1,1,2,3,5,8,13,21,34}.

Write a program that takes a positive integer n, assuming n is greater than 2, and print the Fibonacci sequence of n numbers. A sample run of the program is as follows.

```
Please enter a number: 10
A Fibonacci sequence of 10 numbers is: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34
```

```
#include <iostream>
using namespace std;

void main()
{
    int n;
    cout << "Please enter a number: ";
    cin >> n;
    cout << "A Fibonacci sequence of " << n << " numbers is: 0, 1, ";

    int firstNum = 0, secondNum = 1, temp;

    for (int i = 1; i <= n - 2; i++)                    // 1 mark
    {
        temp = firstNum + secondNum;                    // 1 mark
        if (i + 1 <= n-2)                               // 0.5 mark
        {
            cout << temp << ", ";
        }
        else {          // 0.5 mark
            cout << temp << endl;
        }

        firstNum = secondNum;                           // 0.5 mark
        secondNum = temp;                               // 0.5 mark
    }









}
```