



UNIVERSITY OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE



Session:	Session 2021/1 st Semester/Fall 2021	Exam: Mid Term	Time: 60 min
Subject:	Programming Fundamentals	Total Weightage: 30	Total Marks: 30
Student Name _____		Roll Number _____	

Q1. If $x = 2$, $y = 5$, $z = 0$ (integer variables) then find values of the following expressions: (2)

- a. $x \% 2 * 100 / y$ b. $500 * y / x + 10$
c. $x != 5 \ \&\& \ y >= 5$ d. $!(z != 0 \ || \ x == 2)$

a. b. c. d.

Q2. Consider the following nested if statement. What will be the output? (1)

```
int x = 8, y = 23, mystery;
if (x > y){
    mystery = x - y;
}
else{
    if (x < y){
        mystery = y / x;
    }
    else{
        mystery = x + y;
    }
}
cout << mystery;
```

Output

Q3. What will be the Output? (1)

```
for(int i=1; i<=5; i++)
{
    /* Inner loop */
    for(int j=5; j>=i; j--)
    {
        cout << "\t" << i*j;
    }
    cout << endl;
}
```

Output

Q4: What will be the Output? (2)

```
#include <iostream>
using namespace std;
int a = 1;
void f() {
    cout << a << endl;
    g();
}
void g() {
    a = 2;
    cout << a << endl;
}
void h() {
    a = 3;
    cout << a << endl;
}

main() {
    cout << a << endl;
    f();
    cout << a << endl;
    h();
    cout << a << endl;
}
```

Output

Q5. What will be the Output? (2)

```
for(int i=1; i<=5; i++)
{
    /* Inner loop */
    for (int j=5; j>=i; j--)
    {
        if(i*j == 15)
        {
            break;
        }
        cout << "\t" << i*j;
    }
    cout << endl;
}
```

Solution of Q5:

Q6. What will be the Output? (2)

```
for(int i=1; i<=5; i++)
{
    /* Inner loop */
    for (int j=5; j>=i; j--)
    {
        if(i*j == 15)
        {
            continue;
        }
        cout << "\t" << i*j;
    }
    cout << endl;
}
```

Solution of Q6:

Q7. Ahmad has developed a computer program using functions that takes input of three sides of a triangle and calculates its area. Although program has no syntax or semantic error but **his programming teacher** is not convinced due to very highly dependent functions (highly coupled) and not understandable function names. You are required to **refactor (rewrite)** the program that has low coupling (reduce dependence between functions) and proper names of the functions and variables. (10)

```
#include<iostream>
#include<cmath>
using namespace std;
/*area of a triangle if the length of its sides
is known by using Heron's formula.
As per the formula, Area =  $\sqrt{s(s-a)(s-b)(s-c)}$ 
where s = Perimeter/2 = (a + b + c)/2
a, b, and c are the length of its sides.*/

float r, s, t, l, p, are;

void x()
{
    p = r + s + t;
    l = p/2;
}

void y()
{
    are = sqrt(l * (l-r) * (l-s) * (l-t));
    cout << "Area of the Triangle is: " << are;
}

main()
{
    cout << "Enter length of side a: ";
    cin >> r;
    cout << "Enter length of side b: ";
    cin >> s;
    cout << "Enter length of side c: ";
    cin >> t;
    x();
    y();
}
```

Q8. A number is said to be Disarium if the sum of its digits raised to their respective positions is the number itself.
Note: Bonus marks will be given if you do not use pre-defined function **pow()** in your solution

<p>a. Create a function that determines whether a number is a Disarium or not.</p> <p>Test Cases:</p> <p>isDisarium(75) → false // $7^1 + 5^2 = 7 + 25 = 32$</p> <p>isDisarium(135) → true // $1^1 + 3^2 + 5^3 = 1 + 9 + 125 = 135$</p>	<p>b. Create a function that finds how many Disarium numbers are within the range of the two integers (including those integers) and then finds the average of those numbers.</p> <p>Test Cases:</p> <p>averageDisarium(1, 200) → 37 // $1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 89 + 135 + 175 = 444/12 = 37$</p> <p>averageDisarium(1, 9) → 5 // $1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 = 45/9 = 5$</p>
<p>Write your Code here:</p>	