**Test Questions**

**Definitions**

*Multiple* A number that can be divided by another number without a remainder.

*Factor* A number that divides into another without a remainder

*Fibonacci sequence* A sequence of numbers in which each number equals the sum of the two preceding numbers. I.e.: 1 1 2 3 5 8...

*Prime Number* A natural number greater than 1 that has no positive divisors other than 1 and itself

*Prime Factor*                                  A factor that is also a prime number.

*Leap Year* A leap year occurs on any year evenly divisible by 4 but not on a century unless it is divisible by 400

*Twentieth Century* 1 Jan 1901 to 31 Dec 2000

*Composite Number* A number containing at least two prime numbers

**Rules – Important**

* Supply a C# project containing the solutions to all the questions answered.
* Do not use Google or any other sources for this test. It is meant to test your own thinking ability and if you use external sources this cannot be tested. If it is found that Google has been utilized then you will not be considered for the position.

**Questions**

**Question 1**

What is the sum total of multiples below 900 of 2 or 4?

**Question 2**

You have inherited a secure web service component that handles a large volume payment commands across disconnected environments. This web service has been optimized to use as little XML as possible and each message is smaller than 10 KB.

If the speed of this solution is considered to be a problem, what steps would you take to solve it?

**Question 3**

What is the sum total of the odd (1, 3, 5, ...) numbers within a Fibonacci sequence where the value is no larger than three million?

**Question 4**

For the number 2310, the prime factors are 2, 3, 5, 7 and 11.

For the number 600881475143, what is the largest prime factor?

**Question 5**

What is the smallest integer that you are able to evenly divide (I.e.: no remainder) using all numbers within range [1 .. 20]?

**Question 6**

Using a Fibonacci sequence, what is the second term to contain over two thousand individual digits?

**Question 7**

You are given the following information:

* The first of January 1900 was a Monday
* In April, June, September and November there are thirty days
* In January, March, April, May, July, August, October and December there are thirty one days
* February has either 28 or 29 depending if it is a leap year

During the twentieth century how many Saturdays fell in the second of the month?

**Question 8**

Using the last 10 prime numbers below 10,000, sum the values which have a remainder of 3 when divided by 7.

**Question 9**

Identify and explain your least favourite feature within your favoured language and how you would rectify it.

**Question 10**

The code below compiles correctly, but contains some best practice mistakes and poor standards of coding. For example the class name should not start with a lower case,

please list any other mistakes.

using System;

using System.Collections.Generic;

using System.Data;

using System.Data.SqlClient;

using System.Linq;

using System.Text;

using System.Threading.Tasks;

namespace InterviewTest

{

public class workflowHandler

{

private bool DoWork(string A, string B)

{

var conn = new SqlConnection("server=SID;Initial Catalog=SID");

SqlCommand comm = new SqlCommand("GetValue", conn);

comm.CommandType = CommandType.StoredProcedure;

comm.Parameters.Add("@search", SqlDbType.VarChar, 15).Value = A;

conn.Open();

var reader = comm.ExecuteReader();

string result = reader.GetValue(0).ToString();

if (result != null)

{

var service = new WebServices.Service();

return service.Validate(B, result);

}

}

}

}