

Q1/25	Q2/25	Q3/15	Q4/15	Q5/20	Total/100

Number: ..... Name-Surname : ..... Group: .....

**Q1) A/ [13pts]** Complete the following C++ code that calculates the harmonic mean of two positive integers entered from the keyboard. The harmonic mean of two positive numbers x and y is given by

$$H = \frac{2}{\frac{1}{x} + \frac{1}{y}}$$

A sample run of the program is given below:

**Please enter two positive integers: 3 6**

**The harmonic mean of 3 and 6 is 4**

```
#include <iostream>
using namespace std;
int main() {
// Declare variables
    _____
    _____
// Print a message and read two integers
    _____
    _____
// Perform the computation
    _____
// Output the result
    _____
return 0;}
```

**B/[12pts]** Evaluate the following C++ expressions if a and b are integers and **a=5, b=3**

$2 * a \% b - 1$  ..... **0**.....

$4 + b / a * 2$  ..... **4**.....

$( - a + b - 1 ) / 2.0$  ..... **-1.5**.....

$b * - b + 32 / a++ * 2$  ..... **3**.....

**Q2) A/[15pts]** The decision table below shows fines imposed for speeding violations. Write a C++ code segment that assigns the correct fine to type double variable **fine** based on the value of type int variable **speed**. Assume that both variables are already declared and the value of the variable **speed** is already assigned.

Speed (mph)	Fine (\$)
65 or less	0
66-70	15.00
71-75	30.00
76-80	75.00
over 80	100.00

```

if (speed <= 65)
    fine = 0;
else if (speed <= 70)
    fine = 15.0;
else if (speed <= 75)
    fine = 30.0;
else if (speed <= 80)
    fine = 75.0;
else
    fine = 100.0;

```

**B/[10pts]** What is the output of the following C++ code segment?

```

for (int i=6; i>=0; i--)
{
    switch(i)
    {
        case 3: cout << "three" << endl; break;
        case 2: cout << "two" << endl;
        case 1: cout << "one" << endl; break;
        case 0: cout << "zero" << endl;
        default: cout << "default" << endl;
    }
    cout << --i << endl;
}

```

```

default
5
default
3
two
one
1
zero
default
-1

```

**Q3) A/[12pts]** Trace the following C++ code and provide its output.

```
#include <iostream>
using namespace std;
int main()
{
    int n=294, sum=0;
    while(n>0)
    {sum=sum+n%10;
    n=n/10;
    }
    cout<<"sum="<<sum<<endl;
return 0;}

```

n	sum	n>0
294	0	T
29	0+4=4	T
2	4+9=13	T
0	13+2=15	F

**Output:**

**Sum=15**.....

**B/[3pts]** Explain verbally in English what does this code actually do?

**Finds the sum of digits of an integer number**.....

**Q4) [15pts]** Complete the following code that finds the product of odd numbers from 3 to 99; i.e.

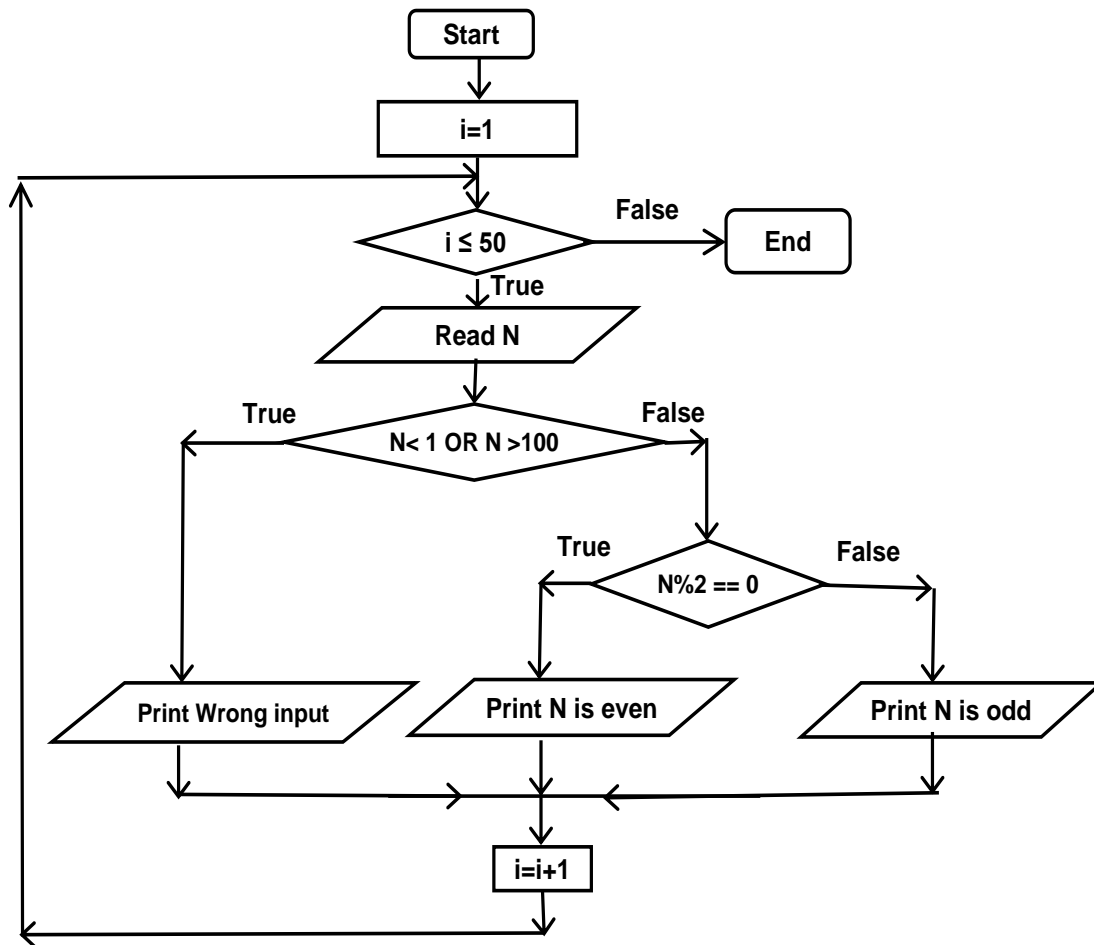
$$\text{Product}=3*5*7*.....*99$$

Let all variables be of type double.

```
#include <iostream>
using namespace std;
int main()
{
    double i,product;
    product =1;
    for(i=3; i<=99; i+=2)
    if (i % 2 == 1) product*=i; // product*=i;
    cout<<"Product="<<product;
return 0;}

```

Q5) [20pnts] Consider the Flowchart below. Complete the given C++ implementation.



```
#include <iostream>
using namespace std;
int main()
{   int i,N;
    for(i=1 ; i<=50 ; ++i)
    {cin>>N;
    if( N<1 || N>100) cout<<<"Wrong input";
    else if( N%2 == 0) cout<<N<<" is even";
    else cout<<N<<" is odd";}
return 0;}
```