1. [12%] What will be shown in the “Message Box” on the screen after the following Visual Basic (VB) code segment executes? Please explain briefly.

Sub Main()
    MsgBox(myfun(21, 6))
End Sub

Function myfun(ByVal a As Short, ByVal b As Short)
    If a = b Then
        myfun = b
    Else
        myfun = myfun(a Mod b, b / 2)
    End If
End Function

Answer:

Explanation:

2. [10%] What is the message on the screen after the following VB code segment executes? Please explain briefly.

Public Class Obj
    Public v As Integer
    Public before As Obj
    Public after As Obj
End Class

Sub Main()
    Dim a As New Obj() : Dim b As New Obj()
    Dim c As New Obj()

3. [10%] What will be the result of the following Matlab (ML) commands:

```
>> A=[linspace(-1,7,5); 2:6];
>> (A>3).*A
ans =
```

Explanation:

4. [12%] Given the ML function file “test.m” that contains:

```
function[a]=test(b,c)
a=b^c;
b=b+2;
```

What is the result of the following ML commands? Please explain your answer briefly.

```
>> b=4; c=2; a=1;
>> test(b,c)+ b + a
ans =
```

Explanation:
5. [12%] What is the result of the following ML commands? Please explain your answer briefly.

```matlab
>> j = 3 > 2;
>> for i = 1:6
  j = j-1;
end
>> j
```

Explanation:

6. [10%] What is the result of the following ML commands? Please explain your answer briefly.

```matlab
>> syms x t
>> diff(limit(x^2+t*x+1, t, 0))
```

Explanation:

7. [9%] Explain briefly (in 2-3 sentences) what an "NP-complete" problem is and give one example of such a problem.
8. [5%] Is factoring large integers an NP-complete problem?

9. [15%] Explain as best as you can how RSA “public key” cryptography works:

10. [5%] Describe the main elements of a Turing machine: