Please answer questions in the space provided. Question point values are shown in parentheses.

1. (15) Assume you have the following variable declarations and assignments:

```
Dim A As Integer, B As Integer, C As Integer
Dim D As Integer, E As Integer
Dim X As Double

A = 40
B = 10
C = 25
D = 2
E = 100
```

Given these values, determine the value of X in each of the following assignment statements:

a. `X = -B ^ 2 / 40`

b. `X = C Mod B * 2`

c. `X = C Mod C \ B`

d. `X = A + B / D + E`

e. `X = -A + -B * C / D * E`

2. (18) For each of the following statements, indicate if it is True or False. Write your answer in the left margin.

    a. All references to a function must be made in the context of an expression, i.e., you cannot reference a function unless it is either all or part of an expression.

    b. When storing something into a String-type variable, it is impossible to generate a type mismatch error.

    c. Although it is not mandatory, it is always a good idea to provide a type (Single, Integer, etc.) when defining a general sub procedure.

    d. A variable declared using the Static statement in a procedure and another variable declared using the Public statement in a Code Module both have the same lifetime.

    e. You can use If…Then…Else statements and the Select…Case statements interchangeably, that is, the only difference is one of style and personal choice.

    f. Using module-level scope for a variable declared with a Dim statement is preferred over local scope even if the variable is only needed in one procedure because then the variable does not have to be recreated each time the procedure is executed.

3. (15) For each of the following, write the correct VB code to accomplish the stated objective.

    a. You have two option buttons named optYes and optNo. Write a code ***segment*** (part of a command button's Click event) that checks the option buttons and sets the integer variable "status" equal to 1 if optYes has been chosen and 2 if optNo has been chosen. You may assume that either one or the other has been chosen.

b. You have two check boxes named chkOvertime and chkHoliday. Write a code ***segment*** (part of a command button's Click event) that tests these check boxes and sets the integer variable "status" equal to one of four values as determined by the following table.

	chkHoliday	
chkOvertime	unchecked	checked
unchecked	1	2
checked	3	4

c. You have an option button named optSummer. Write the ***complete*** appropriate event procedure that sets the module-level integer variable "season" equal to 4 if the user clicks on the option button to turn it on.

4. (18) Using the code shown below, indicate the output generated by the three Form1.Print statements when the cmdQ4_Click() event is executed.

```
Option Explicit

Dim a As Integer
Dim b As Integer

_____________________
Private Sub cmdQ4_Click()
   Dim a As Integer
   Dim c As Integer
   a = 10
   b = 20
   c = 30

   doSubA a, b, c
   Form1.Print a, b, c

   doSubB c, b
   Form1.Print a, b, c

   doSubC a, b, c
   Form1.Print a, b, c

End Sub
```

```
Private Sub doSubA(ByVal x As Integer, _
        y As Integer, ByVal z As Integer)
   Dim b As Integer
   b = x
   y = b
   z = z + 1
End Sub

_____________________________________
Private Sub doSubB(x As Integer, y As Integer)
   Static c As Integer
   c = c + 1
   b = c
   x = y + 10
   a = 55
End Sub

_____________________________________
Private Sub doSubC(a As Integer, _
        b As Integer, c As Integer)
   doSubB a, b
   a = b
   c = c + 1
End Sub
```

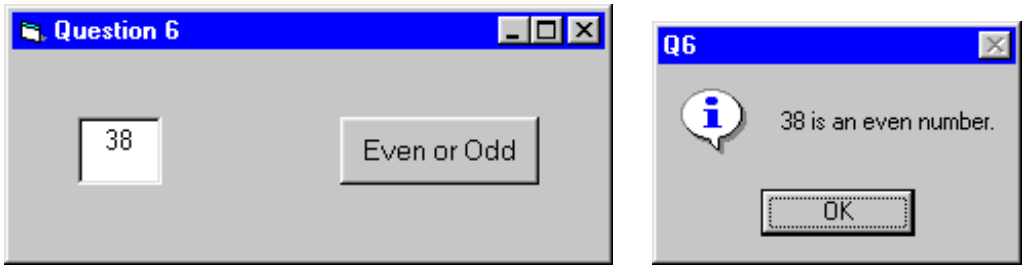
5. (16) The KeyPress event shown below is designed to enforce the following rules:

   a. Make the Enter (Return) key act like the Tab key.
   b. Turn lowercase letters into their uppercase equivalents.
   c. Reject all digits and the Backspace key and beep.
   d. Accept a right parenthesis “)” but only if at least one left parenthesis has already been entered. If rejected then issue a beep.
   e. Accept all other keystrokes.

   The code below contains errors (both syntax and logic) that mean the rules expressed above will not be correctly enforced. Find each error ***and*** correct it.

```
Private Sub txtQ5_KeyPress(KeyAscii As Integer)

   Select Case KeyAscii

      Case vbKeyReturn

         KeyAscii = 9

      Case "a" To "z"

         KeyAscii = KeyAscii + 32

      Case 0 To 9, vbKeyBack

         ‘ do nothing

      Case ")"

         KeyAscii = 0

         Beep

   End Select

End Sub
```

6. (18) The screen images below show an application that can determine if a number is an even or odd number.



The click event for the "Even or Odd" command button shown above is:

```
Private Sub cmdEvenOrOdd_Click()
   Dim number As Integer
   number = txtTestValue.Text
   If even(number) Then
      MsgBox number & " is an even number.", vbInformation
   Else
      MsgBox number & " is an odd number.", vbInformation
   End If
End Sub
```

Write the ***complete*** sub procedure or function (whichever is appropriate) for the routine "even" referenced in the code above. Remember that all even numbers are evenly divisible by 2.

Answer Key

1. a. -2.5
   b. 5
   c. 1
   d. 145
   e. -12540

2. a. True
   b. True
   c. False – functions, not general sub procedures, have types.
   d. False – unlike the global variable, the static variable will "die" if the form is unloaded.
   e. True
   f. False – you always want to use the narrowest scope possible.

3. a. A sample solution is:

```
If optYes.Value = True Then
   status = 1
Else
   status = 2
End If
```

   b. A sample solution is:

```
If chkOvertime.Value = vbUnchecked Then
   If chkHoliday.Value = vbUnchecked Then
      status = 1
   Else ' Holiday is checked
      status = 2
   End If
Else ' Overtime is checked
   If chkHoliday.Value = vbUnchecked Then
      status = 3
   Else ' Holiday is checked
      status = 4
   End If
End If
```

   c. A sample solution is:

```
Private Sub optSummer_Click()
   season = 4
End Sub
```

4. The output from the three form1.print statements is

10	10	30
10	1	11
2	2	12

5. A correct version of the KeyPress event is:

```
Private Sub txtQ5_KeyPress(KeyAscii As Integer)

  Select Case KeyAscii
    Case vbKeyReturn
      SendKeys "{tab}"
      KeyAscii = 0
    Case Asc("a") To Asc("z")
      KeyAscii = KeyAscii - 32
    Case vbKey0 To vbKey9, vbKeyBack
      KeyAscii = 0
      Beep
    Case Asc(")")
      If InStr(1, txtQ5.Text, "(") = 0 Then
        KeyAscii = 0
        Beep
      End If
  End Select

End Sub
```

6. A correct version of the function is:

```
Public Function even(ByVal x As Integer) As Boolean

  If x Mod 2 = 0 Then
    even = True
  Else
    even = False
  End If

End Function
```