

Solutions to Exam A

January 2010

1)

- i) If A1 plays the role of the variable x, then one possible way of writing the function is:

	A	B
1	0	
2		
3		=IF(A1>=6;ABS(A1);IF(OR(A1=3;A1=5);FACT(A1);EXP(A1)))
4		

The values of the function at -2 and 4 are simply $f(-2) = 0.135335$ and $f(4) = 54.5982$.

Marking: 2 marks for the correct values of $f(-2)$ and $f(4)$. 7 marks for the correct function structure and 3 marks for using the correct Excel Built-in functions for factorial, exponential and absolute value.

- ii) In order to answer part ii) it is convenient to re-write the functions in a form similar to part i). If we call the first function $g(x)$ and the second function $h(x)$, they are:

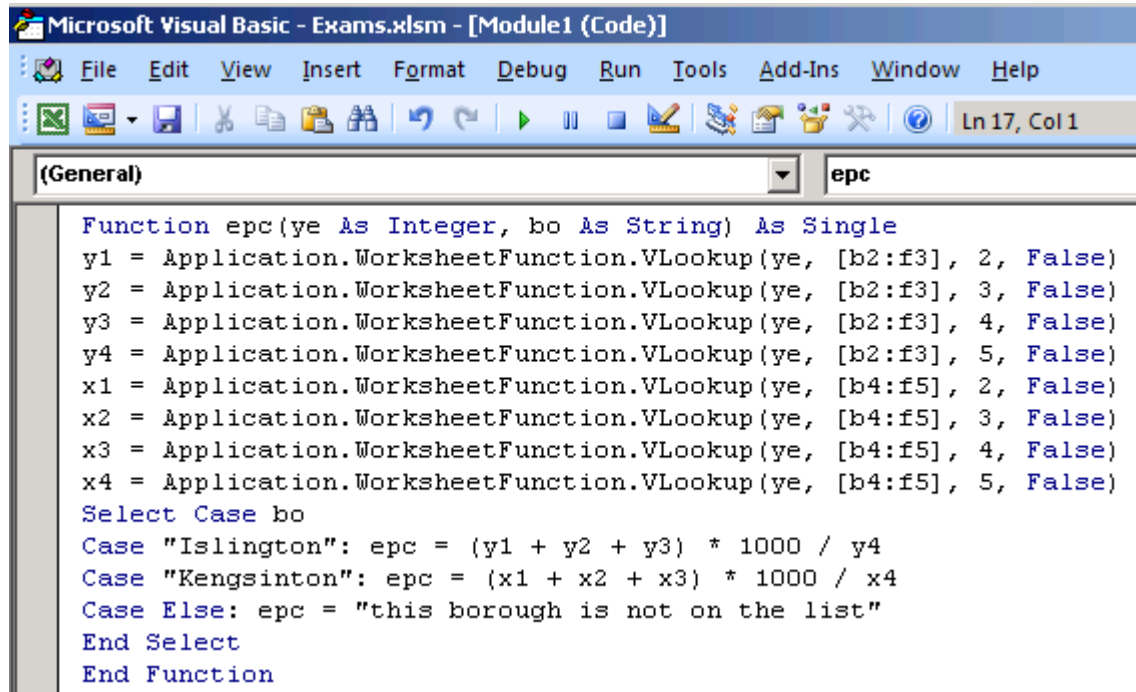
$$g(x) = \begin{cases} x^2 & \text{for } x \leq 2 \\ x^3 & \text{otherwise} \end{cases}$$

$$h(x) = \begin{cases} 1 & \text{for } x < 0 \text{ or } 1 < x < 2 \\ 0 & \text{for } 0 \leq x \leq 1 \\ x & \text{otherwise} \end{cases}$$

Therefore, for function $g(x)$, the function is zero at $x=0$ and is positive everywhere else. The function $h(x)$ vanishes for $0 \leq x \leq 1$ and is positive everywhere else.

Marking: 6 marks for correct answer for function $g(x)$ and 7 marks for correct answer for function $h(x)$.

2)



```
Microsoft Visual Basic - Exams.xlsm - [Module1 (Code)]
File Edit View Insert Format Debug Run Tools Add-Ins Window Help
Ln 17, Col 1
(epc)
Function epc(ye As Integer, bo As String) As Single
y1 = Application.WorksheetFunction.VLookup(ye, [b2:f3], 2, False)
y2 = Application.WorksheetFunction.VLookup(ye, [b2:f3], 3, False)
y3 = Application.WorksheetFunction.VLookup(ye, [b2:f3], 4, False)
y4 = Application.WorksheetFunction.VLookup(ye, [b2:f3], 5, False)
x1 = Application.WorksheetFunction.VLookup(ye, [b4:f5], 2, False)
x2 = Application.WorksheetFunction.VLookup(ye, [b4:f5], 3, False)
x3 = Application.WorksheetFunction.VLookup(ye, [b4:f5], 4, False)
x4 = Application.WorksheetFunction.VLookup(ye, [b4:f5], 5, False)
Select Case bo
Case "Islington": epc = (y1 + y2 + y3) * 1000 / y4
Case "Kingsington": epc = (x1 + x2 + x3) * 1000 / x4
Case Else: epc = "this borough is not on the list"
End Select
End Function
```

$epc(2006, "Islington") = 6,43545961$

Marking: 8 points for the correct Select Case structure, 4 points for correct definition of input and output data type, 8 points for correct use of Vlookup functions, 3 points for correct formulae for epc and 2 points for correct value of epc(2006, "Islington").

3)

```
Function avail(x As Date) As String
If Month(x) = 6 Or Month(x) = 7 Or Month(x) = 8 Then
avail = "Not available"
Else
If Weekday(x) = 2 Or Weekday(x) = 3 Or Weekday(x) = 6 Then
avail = "Available between 12:00 and 15:00"
ElseIf Weekday(x) = 4 Or Weekday(x) = 5 Then
avail = "Available between 15:00 and 17:00"
Else
avail = "Not available on weekends"
End If
End If
End Function
```

$avail(1986-12-22) = \text{"Available between 12:00 and 15:00"}$

Marking: 12 points for the correct IF...ELSEIF structures, 4 points for correct definition of input and output data type, 6 points for correct use of Month and Weekday functions, 3 points for correct value of avail(1986-12-22).

4)

```
Function weave (na As String) As Variant
If na = "Smith" Or na = "Patel" Or na = "Hussain" Or na = "Solanki" Then
c1 = Application.WorksheetFunction.HLookup("F1", [b1:e6], 6, False)
c2 = Application.WorksheetFunction.HLookup("F2", [b1:e6], 6, False)
c3 = Application.WorksheetFunction.HLookup("F3", [b1:e6], 6, False)
c4 = Application.WorksheetFunction.HLookup("F4", [b1:e6], 6, False)
s1 = Application.WorksheetFunction.VLookup(na, [a2:e5], 2, False)
s2 = Application.WorksheetFunction.VLookup(na, [a2:e5], 3, False)
s3 = Application.WorksheetFunction.VLookup(na, [a2:e5], 4, False)
s4 = Application.WorksheetFunction.VLookup(na, [a2:e5], 5, False)
weave = (s1 * c1 + s2 * c2 + s3 * c3 + s4 * c4) / (c1 + c2 + c3 + c4)
Else
weave = "not on record"
End If
End Function
```

weave("Solanki")= 77,58636364

Marking: 7 points for the correct HLOOKUP functions, 7 points for correct VLOOKUP functions, 4 points for correct formula, 4 points for correct definition of data type for input and output, 3 points for correct value of weave("Solanki").