

Solutions to Exam B

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	Exam B	=IF(A1<=1;ABS(A1);IF(OR(A1=2;A1=4);FACT(A1);EXP(A1)))
4		

The values of the function at 0 and 6 are simply $f(3) = 20.0855$ and $f(6) = 403,429$.

Marking: 2 marks will be awarded for the correct values of $f(3)$ and $f(6)$. The remaining 10 marks will be awarded for a correct function, with 7 marks for the correct 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:

$$g(x) = \begin{cases} x^2 & \text{for } x \leq 1 \\ x^4 & \text{otherwise} \end{cases}$$
$$h(x) = \begin{cases} 0 & \text{for } x < 0 \text{ or } x = 1 \\ 1 & \text{for } 1 < x < 2 \text{ or } 0 \leq x < 1 \\ x^2 & \text{otherwise} \end{cases}$$

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

```

Function epc2(ye As Integer, bo As String) As Single
    y1 = Application.WorksheetFunction.VLookup(ye, [b6:f7], 2, False)
    y2 = Application.WorksheetFunction.VLookup(ye, [b6:f7], 3, False)
    y3 = Application.WorksheetFunction.VLookup(ye, [b6:f7], 4, False)
    y4 = Application.WorksheetFunction.VLookup(ye, [b6:f7], 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)
    If bo = "Haringey" Then
        epc2 = (x1 + x2 + x3) * 1000 / x4
    ElseIf bo = "Harrow" Then
        epc2 = (y1 + y2 + y3) * 1000 / y4
    Else
        epc2 = "this borough is not on the list"
    End If
End Function

```

epc(2007,"Harrow")= 4,454008

Marking: 8 points for the correct IF...ELSEIF 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 of correct value of epc(2007,"Harrow").

3)

```

Function timetable(x As Date) As String
    Select Case Month(x)
    Case 6, 7, 8: timetable = "Not available"
    Case Else:
        Select Case Weekday(x)
        Case 2, 4, 6: timetable = "Available between 11:00 and 12:00"
        Case 3, 5: timetable = "Available between 14:00 and 17:00"
        Case Else: timetable = "Not available on weekends"
        End Select
    End Select
End Function

```

TIMETABLE(1967-09-13)= "Available between 11:00 and 12:00"

Marking: 12 points for the correct SELECT CASE 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 TIMETABLE(1967-09-13).

4)

```

Function wave(na As String) As Variant
If na = "Smith" Or na = "Patel" Or na = "Hussain" Or na = "Solanki" Then
c1 = Application.WorksheetFunction.HLookup("M1", [b1:e2], 2, False)
c2 = Application.WorksheetFunction.HLookup("M2", [b1:e2], 2, False)
c3 = Application.WorksheetFunction.HLookup("M3", [b1:e2], 2, False)
c4 = Application.WorksheetFunction.HLookup("M4", [b1:e2], 2, False)
s1 = Application.WorksheetFunction.VLookup(na, [a3:e6], 2, False)
s2 = Application.WorksheetFunction.VLookup(na, [a3:e6], 3, False)
s3 = Application.WorksheetFunction.VLookup(na, [a3:e6], 4, False)
s4 = Application.WorksheetFunction.VLookup(na, [a3:e6], 5, False)
wave = (s1 * c1 + s2 * c2 + s3 * c3 + s4 * c4) / (c1 + c2 + c3 + c4)
Else
wave = "not on record"
End If
End Function

```

wave("Smith")= 61,42727273

Marking: 8 points for the correct HLOOKUP functions, 8 points for correct VLOOKUP functions, 6 points for correct formula, 3 points for correct value of wave("Smith").