
CITY UNIVERSITY LONDON
Excel VBA Progress Test

11-th of January 2006

Group A

This is an open book exam. You may use your lecture notes as well as task- and solution-sheets from previous lab-sessions in printed form.

Write down your complete answers in the booklet provided.

Full marks may be obtained for correct answers to all four questions. Each questions carries 25 marks.

To avoid possible accusations of cheating close **all** other applications except Excel before starting this exam.

Time: You have 90 mins to complete this test.

Turn over

- 1) i) Write down the command line for an Excel built-in function which produces the following function

$$f(x) = \begin{cases} \sqrt{7x^3} & \text{for } x \geq 0 \\ \text{value is complex} & \text{for } x < 0. \end{cases}$$

This means for $x \geq 0$ the function should compute $\sqrt{7x^3}$ and for $x < 0$ the function should produce the output “value is complex”. Use your function to compute $f(-5)$ and $f(31)$.

- ii) Write down the two functions which are produced by the following combinations of Excel built-in functions:

a) =IF(AND(x>-15,x<=10), IF(x<=6,EXP(x),SIN(x)), x^3/5)

b) =IF(NOT(OR(x>9,x<=-1)), 1/2,0)

Compute $f(0)$ and $f(15)$ in each case.

- 2) Design a user defined function called “sumcol” which computes conditional sums from a table. The function should have two input variables. The first parameter contains a condition which is used as a criterium to select out particular values from column A. The second parameter identifies the column from which the corresponding values should be taken and summed up. Use the worksheetfunction SUMIF and a SELECT CASE syntax in your program.

Design four cases. 1: sums up the values from column A corresponding to the specified condition. 2: sums the values from column B, which correspond to the specified entries in column A, 3: sums the values from column C, which correspond to the specified entries in column A and 4: sums the values from column D, which correspond to the specified entries in column A. Your function should produce the error message “Only case 1,2,3 or 4 can be used!”, when none of the four cases is selected.

	A	B	C	D
1	11	25	1	198
2	0	12	3	637
3	55	0	5	47
4	5	26	7	293
5	-8	78	9	44
6	25	67	11	381
7	-19	3	13	22
8	61	31	15	802
9	92	13	17	228
10	69	17	19	59

For the above table some example command lines and outputs are:

=sumcol("<0",1) → -27, =sumcol("<0",3) → 22, =sumcol(">80",4) → 228

Use your function to compute for the above table:

=sumcol(">0",4), =sumcol("<>0",2), =sumcol("<50",2), =sumcol("<=3",3)

Turn over

- 3) Write a user defined function called "*days*" which determines for two arbitrary dates whether they fall on the same day of the week. If they do not fall on the same day, let your function return the message "The weekdays for the two dates are different." In case they fall both on a Sunday let your function return the message "Both dates fall on a Sunday." When the weekdays coincide, but are not a Sunday the function should produce the message "Both dates fall on the same day of the week."

Use two nested IF structures to produce this function. Declare all your variable types including auxillary variables.

Use your function to determine which of the following four people are born on the same day of the week. Isaac Newton (25-th of December 1642), Albert Einstein (14-th of March 1879), Gottfried Wilhelm Leibniz (1-st of July 1646) and Stephen Hawking (8-th of January 1942).

- 4) Write a user defined function named CW, which calculates the molecular weight from a given chemical formula by reading off the data from a given table. Your function should work for molecules which contain two different types of atoms. The function should have four input variables. Two containing the chemical symbols for the two atoms and further two containing the number of times these atoms occur in the molecule. With the help of the worksheetfunction VLOOKUP pick from the table below the corresponding atomic weight for a given symbol.

	A	B	C	D
1	Symbol	Name	Number	Atomic weight
2	Al	Aluminium	13	26.981539
3	As	Arsenic	33	74.92159
4	Ba	Barium	56	137.327
5	Be	Beryllium	4	9.012182
6	H	Hydrogen	1	1.00794
7	Hg	Mercury	80	200.59
8	O	Oxygen	8	15.9994
9	K	Potassium	19	39.0983
10	Na	Sodium	11	22.989768
11	S	Sulphur	16	32.066

(The table shown here is only part of the entire table of the elements which contains all 109 elements.) Round your result to two decimal places. Include a comment into the function "this function calculates molecular weights". Declare all your variable types including auxillary variables.

For instance for water, i.e. H_2O the command line for your function should be =CW(H,2,O,1) and produce the value 18.02, for Barium dioxide i.e. BaO_2 the command line for your function should be CW(Ba,1,O,2) and should produce the value 169.33, etc.

Compute the weights for potassium superoxide KO_2 and red arsenic As_4S_4 .

Internal examiner: Dr. Andreas Fring