

**THE UNIVERSITY OF BRITISH COLUMBIA**  
**Department of Chemistry**

**CHEM 121 – Section 110**  
**QUIZ #1 (September 21, 2009)**

LAST NAME: \_\_\_\_\_

FIRST NAME(S): Key

SIGNATURE: \_\_\_\_\_

STUDENT NUMBER: \_\_\_\_\_

**REGULATIONS REGARDING QUIZZES**

Candidates guilty of any of the following, or similar, dishonest practices shall receive a grade of zero (0):

- a) Making use of any books, papers, pre-programmed information in calculators, cell phones, or other memoranda other than those authorized by the examiners.
- b) Speaking or communicating with other candidates.
- c) Purposely exposing written papers to the view of other candidates.

The plea of accident or forgetfulness shall not be received.

**The only acceptable calculator is the Sharp EL-510R.**

Marks	Q1	_____ / 7
	Q2	_____ / 4
	Q3	_____ / 2
	Q4	_____ / 3
	<b>Total</b>	_____ / 16

Q1) Complete the following table for the element aluminum  $^{27}_{13}\text{Al}$ :

Property	Your answer
Periodic table <i>group number</i>	13 (old 3A)
Periodic table <i>period number</i>	3
Periodic table <i>block name</i>	p-block
<i>Atomic mass (u)</i>	27 u
Number of <i>protons</i>	13
Number of <i>valence electrons</i>	3
Approximate $Z_{\text{eff}}$	+3 ( $Z - S = 13 - 10$ )

Marks

1

1

1

1

1

1

1

1/7

Q2) For the set of elements **K, Ca, Se, Br**, and **Kr**, complete the following table:

Question	Your answer
Which has the <i>largest</i> atomic radius?	K
Which releases the <i>greatest</i> amount of energy when an electron is added?	Br
Which has the <i>greatest</i> 1 <sup>st</sup> ionization energy?	Kr
Which has the <i>smallest</i> 2 <sup>nd</sup> ionization energy?	Ca

Marks

1

1

1

1

1/4

Q3) In the dichromate anion  $\text{Cr}_2\text{O}_7^{-2}$ , what are the *oxidation states* of the oxygen and chromium atoms?

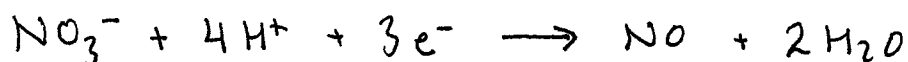
Marks

chromium +6

oxygen -2

1, 1/2

Q4) Give a balanced redox half-reaction for the conversion of nitrate ( $\text{NO}_3^-$ ) to nitric oxide ( $\text{NO}$ ) in acidic solution.



1/3