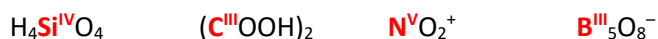


## General and Inorganic Chemistry II – preliminary test; solution

1. Calculate the oxidation number of the highlighted atom (4x1 p)



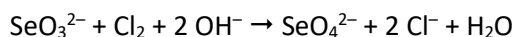
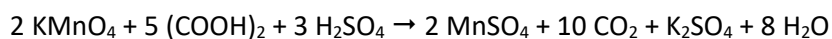
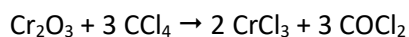
2. Name the following compounds (5x1 p):

$\text{H}_2\text{SeO}_3$	selenous acid
$\text{Na}_2\text{CO}_3$	sodium carbonate
$\text{NO}_2$	nitrogen dioxide <i>or</i> nitrogen(IV) oxide
KHS	potassium hydrosulfide
$[\text{Co}(\text{H}_2\text{O})_4(\text{NH}_3)_2]^{2+}$	tetraaqua-diammincobalt (II) cation

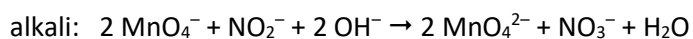
3. Write the formula (5x1 p):

perchlorate anion	$\text{ClO}_4^-$
tin tetrabromide	$\text{SnBr}_4$
ammonium nitrate	$\text{NH}_4\text{NO}_3$
strontium peroxide	$\text{SrO}_2$
tripotassium hexacyanidoferrate(III)	$\text{K}_3[\text{Fe}(\text{CN})_6]$

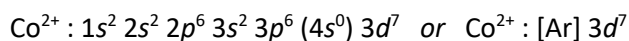
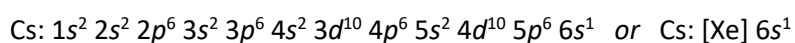
4. Balance the following two reactions (3x5 p.):



5. Based on a balanced reaction, determine, whether the following reaction proceeds in acidic or alkali solution (5 p):



6. Write electron configurations of caesium atom and  $\text{Co}^{2+}$  cation (2x5 p).



7. In each pair, choose the element with a higher electronegativity (3x1 p):

Mg vs Ba                      Mg

Si vs Cl                        Cl

F vs Sb                        F

8. In each pair, choose the compound, whose bond is more ionic (3x1 p):

KF vs SO<sub>2</sub>                      KF

SO<sub>4</sub><sup>2-</sup> vs Na<sub>3</sub>N                      Na<sub>3</sub>N

BBr<sub>3</sub> vs BaBr<sub>2</sub>                      BaBr<sub>2</sub>

8. The aqueous solution of Na<sub>2</sub>CO<sub>3</sub> is: acidic – neutral – basic (choose one option) (6 p). Why? Demonstrate by a chemical equation (4 p).

The solution is basic: Na<sup>+</sup> is not hydrolysing, carbonate hydrolyses ( $\text{CO}_3^{2-} + \text{H}_2\text{O} \rightleftharpoons \text{HCO}_3^- + \text{OH}^-$ )

9. Read through the statements below and classify them as true or false (5 p each statement, i.e. 50 in total):

a) Maximum oxidation number of p-block elements is given as (number of the group–10). – TRUE

b) The maximum oxidation number of manganese is +VII. – TRUE

c) Iron is not a noble metal, therefore it forms cations readily. – TRUE

d) All metals are inert towards water under normal conditions (101,325 Pa, 20 °C). – FALSE

e) Molecule of oxygen (O<sub>2</sub>) contains a triple bond. – FALSE

f) All gaseous non-metals form diatomic molecules. – FALSE

g) Water is a polar solvent. – TRUE

h) A covalent bond is based on sharing valence electrons. – TRUE

i) The molecule of nitrogen (N<sub>2</sub>) is very stable and reacts only under specific conditions. – TRUE

j) Most elements in the PT are gases. – FALSE