10th grade assignments

1) Hydroxide **B** and ignited hydrogen are formed, when metal **A**, which contains 20 neutrons, reacts highly energetically with water.

a) Identify and name:

i) substance **A** and explain the choice

ii) substance **B**

Free metal **D** is obtained when oxide **C**, which contains 93,1% element **D** with oxidation number +1, is reduced with hydrogen.

b) Identify and name substances **C** and **D**, provide calculations.

c) Write and balance all chemical equations given in the assignment.

d) How many grams of substance **B** can theoretically be obtained from the reaction $A + H_2O \rightarrow B + H_2\uparrow$, when water for this reaction was acquired by reducing 58g of oxide **C** with hydrogen ?

2) Gaseous element **A**, which corrodes metals, reacts with H_2 at very low temperatures while giving substance **B**. When dissolving gas **B** in water, an acid **C** is formed, which can not be stored in glass containers. Acid **C** reacts with SiO_2 (one of the main components of glass), giving a 9-atomic 3-elemental acid **D**, where the oxidation level of Si is maximum. When substance **A** reacts with aqueous solution of NaOH, the following products are formed: I) water, II) 3-atomic binary compound **E** in which oxygen has a rare oxidation level, and III) sodium salt **F**.

a) Identify, give formulas and name substances **A,B,C,E** and **F.**

b) Write and balance the following equations:

i) **A** + $H_2 \rightarrow$? ii) SiO_2 + **C** → ? iii) **A** + NaOH → ?

3) Finish and balance reactions **a-h**.

$$Br_2 \xrightarrow{a} HBr \xrightarrow{b} AlBr_3 \xrightarrow{c} Al(OH)_3 \xrightarrow{d} Al(NO_3)_3 \xrightarrow[t^0]{e} Al_2O_3 + NO_2 \xrightarrow{f} Al \xrightarrow{g} Fe \xrightarrow{h} FeCl_3$$

4) Salt **C** and water are formed when metal oxide **A** reacts with acid **B**. Free metal **D** and Mg-salt **E** are obtained after the reaction between dry salt **C** and magnesium. 5,6 l of hydrogen and an equivalent amount of metal **D** salt **G** were collected after 6 grams of metal **D** reacted with acid **F**. The ratio of hydrogen and metal **D** coefficients is 2:1. In substances **A, C, G** the oxidation level of metal **D** is maximum. **B** and **F** are binary monoprotic acids. Also the following connections are given: **M(G)=1,55·M(A)** and **M(C)=2,375·M(A)**.

a) Identify:

i) substances **A,C,D,G** with calculations and give their names and formulas

ii)substances **B, E, F** and give their names and formulas.

b) Write and balance all chemical equations given in the assignment.

c) Which of the acids, **B** or **F**, is stronger? Why?