Chemistry 11
Stoichiometry Review
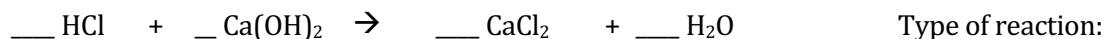
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1. **Name** the following compounds:

    A. NaBr

    B. AgI

    C. $HgHCO_3$

    D. $CuSO_4$

    E. NO_2

2. Write the **formulas** for the following:

    A. Nitrogen monoxide

    B. Sodium nitrite

    C. Calcium sulfide

    D. Magnesium acetate

    E. Oxygen difluoride

3. **Balance** the following and identify the **type of reaction**

___ Na_2O + ___ H_2O → ___ NaOH   Type of reaction:

___ Cu_2O + ___ H_2 → ___ H_2O + ___ Cu   Type of reaction:

___ H_2 + ___ O_2 → ___ H_2O Type of reaction:
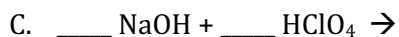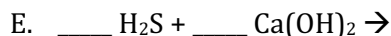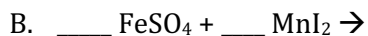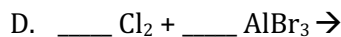
___ Na + ___ H_2O → ___ NaOH + ___ H_2 Type of reaction:

___ HCl + _ $Ca(OH)_2$ → ___ $CaCl_2$ + ___ H_2O Type of reaction:
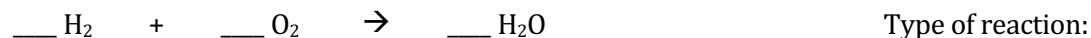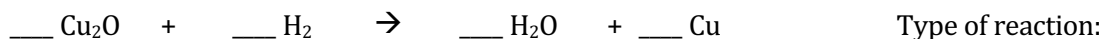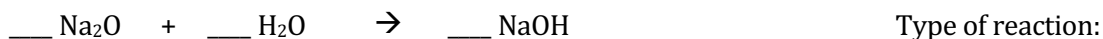
4. **Complete** and **balance** the following reactions:

A. ___ NH_3 →

B. ___ $FeSO_4$ + ___ MnI_2 →

C. ___ NaOH + ___ $HClO_4$ →

D. ___ Cl_2 + ___ $AlBr_3$ →

E. ___ H_2S + ___ $Ca(OH)_2$ →

F. ___ $BaCl_2$ + ___ Na_2SO_4 →
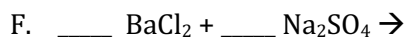
5. Consider the following reaction:

$$6\ Cu + 2\ H_3PO_4 \rightarrow 2\ Cu_3PO_4 + 3\ H_2$$

    a. Calculate the mass of hydrogen gas produced when 84.5 g of Cu metal reacts.

    b. If 3.85 L of H_2 at STP is produced, what mass of Cu reacted?

6. A reaction between potassium and chlorine produced 175.0 grams of the product. How many atoms of each of potassium and chlorine were needed for the reaction?
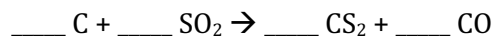
7. Consider the following reaction:

_____ NH_3 + ___ NaOCl → ____ N_2H_4 + _____ NaCl + _____ H_2O

    a. If 60.0 mL of 1.5 M NaOCl reacts with excess ammonia, how many moles of NaCl will be produced?

    b. If 39.7 g of water is produced, what volume of 3.42 M NaOCl is needed?
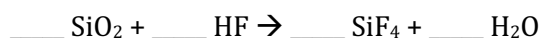
8. Consider the reaction below:

_____ C + _____ SO$_2$ → _____ CS$_2$ + _____ CO

    a. What mass of CS$_2$ is produced when 36.5g of SO$_2$ is reacted with 18.5 g of C?

    b. How much excess reactant is left over?

9. Consider the reaction below (Zn is a 2+ ion):

_____ Zn + _____ HCl →
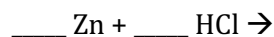
    a. Predict the products and balance the chemical reaction
    b. What mass of impure zinc is required to produce 955 mL of hydrogen gas at STP? The zinc has a purity of 84.5%
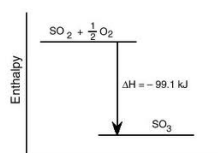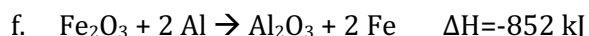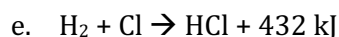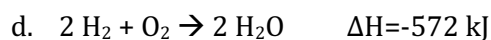
10. Consider the reaction below:

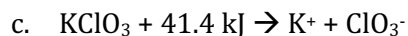_____ SiO$_2$ + _____ HF → _____ SiF$_4$ + _____ H$_2$O

When 12.20 g of SiO$_2$ is reacted with a small excess of HF, 2.50 g of water is produced. What is the percentage yield of H$_2$O?

11. Consider the reaction of magnesium hydroxide with phosphoric acid:

3 Mg(OH)$_2$ + 2 H$_3$PO$_4$ → Mg$_3$(PO$_4$)$_2$ + 6 H$_2$O
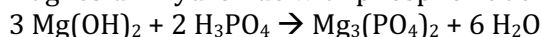
a) Calculate the mass of magnesium phosphate that will be formed from the reaction of 15.0g of 92.5% magnesium hydroxide with an excess of phosphoric acid.

b) Calculate the mass of 88.5% magnesium hydroxide needed to make 127g of Mg$_3$(PO$_4$)$_2$.

c) Calculate the percent purity of a sample of Mg(OH)$_2$ if 2.568g of the sample reacts with 38.45 mL of pure 0.6695M H$_3$PO$_4$.

12. State whether the following are endothermic or exothermic reactions:

    a. CH$_4$ + 2 O$_2$ → CO$_2$ + 2 H$_2$O + 891 kJ

                                                             _____

    b. C + D → CD   ΔH=-65.8 kJ

                                                             _____

    c. KClO$_3$ + 41.4 kJ → K$^+$ + ClO$_3^-$

                                                             _____

    d. 2 H$_2$ + O$_2$ → 2 H$_2$O   ΔH=-572 kJ

                                                             _____

    e. H$_2$ + Cl → HCl + 432 kJ

    f. Fe$_2$O$_3$ + 2 Al → Al$_2$O$_3$ + 2 Fe   ΔH=-852 kJ

                                                             _____

    g.

                                                             _____

    h. E + F + 437 kJ → G + H

                                                             _____