Chemistry Department

S3 Chemistry

Chemical Changes and Structure

(d) Formula and Reaction Quantities

HOMEWORK

Homework 15   Chemical formulae 2   /15

1. Write the chemical formula for each of the following compounds:

    a) Lithium phosphate   f) Silver (I) phosphate
    b) Magnesium chloride   g) Tin (IV) chloride
    c) Sodium nitrate   h) Iron (III) sulfate
    d) Calcium sulfate   (i) Copper (II) carbonate
    e) Ammonium nitrate   (j) Gold (I) iodide

    (10)

2. Write the ionic formula (showing ionic charges) for each of the following compounds:

    a) Calcium sulfate
    b) Sodium carbonate
    c) Magnesium nitrate
    d) Calcium hydroxide
    e) Aluminium hydroxide

    (5)

Homework 16   Gram Formula Mass   /10

1   For each of the following compounds calculate the gram formula mass (mass of one mole in grams).

    a) Ammonium chloride, NH_4Cl f) Calcium sulfate, $CaSO_4$
    b) Potassium permanganate, $KMnO_4$ g) Sodium carbonate, Na_2CO_3
    c) Magnesium nitrate, $Mg(NO_3)_2$ h) Silver (I) Phosphate, Ag_3PO_4
    d) Tin (IV) Chloride, $SnCl_4$ i) Lithium nitrate, $LiNO_3$
    e) Iron (III) sulfate, $Fe_2(SO_4)_3$ j) Ammonium nitrate, NH_4NO_3

    (10)

Homework 17   Mole calculations 1   /16

1   Calculate how many moles are in:

    a) 14 g of Nitrogen, N_2 e) 20g of Sodium, Na
    b) 400g of copper (II) oxide, CuO   f) 85g of lithium chloride, LiCl
    c) 30g of aluminium sulfide, Al_2S_3 g) 2.2g of carbon dioxide, CO_2
    d) 84g of magnesium carbonate, $MgCO_3$ h) 321g of iron (III) hydroxide, $Fe(OH)_3$

    (16)

Homework 18   **Mole calculations 2**   **/15**

1.   What is the mass (g) of:
        a) 2 moles of Argon, Ar
        b) 10 moles of Oxygen, O_2
        c) 0.01 moles of nitric acid, HNO_3
        d) 0.5 moles of Copper, Cu
        e) 0.25 moles of copper (II) oxide, CuO

                                                                                        (10)

2.   Five moles of an unknown substance was found to weigh 325g. What was the gram formula mass of
        the substance?

                                                                                        (2)

3.   A substance has a gram formula mass of 95g. Its formula is XCl_2. ¬What could element X be?

                                                                                        (2)

4.   The substance E_2O has a gram formula mass of 62 g. Identify element E.

                                                                                        (1)

Homework 19   **Balancing equations**   **/10**

Balance the following equations:

| 1.	H_2	+	F_2	⟶	HF			(1)
2.	Mg	+	HCl	⟶	$MgCl_2$	+	H_2	(1)
3.	P	+	O_2	⟶	P_2O_3			(1)
4.	Mg	+	HNO_3	⟶	Mg $(NO_3)_2$	+	H_2	(1)
5.	NaCl	+	$BaSO_4$	⟶	$BaCl_2$	+	Na_2SO_4	(1)
6.	Fe	+	O_2	⟶	Fe_2O_3			(1)
7.	Sodium + Water			⟶	Sodium Hydroxide + Hydrogen			(2)
8.	Methane (CH_4) + Oxygen			⟶	Carbon Dioxide + Water			(2)

1.   When hydrogen reacts with fluorine the compound hydrogen fluoride is produced. Calculate the mass of hydrogen fluoride produced when 10g of hydrogen reacts with excess fluorine.

$$H_2 \quad + \quad F_2 \longrightarrow \qquad\qquad 2\ HF$$

(3)

2.   Calculate the mass of barium chloride produced when 117g of barium sulfate reacts with excess sodium chloride.

$$2\ NaCl \quad + \quad BaSO_4 \longrightarrow \qquad BaCl_2 \quad + \quad Na_2SO_4$$

(3)
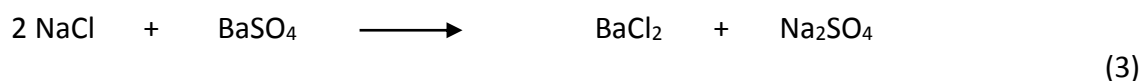
3.   Calculate the mass of oxygen required to react with methane (CH_4) to produce 72g of water.

$$CH_4 \quad + \quad 2\ O_2 \longrightarrow \qquad CO_2 \quad + \quad 2\ H_2O$$

(3)
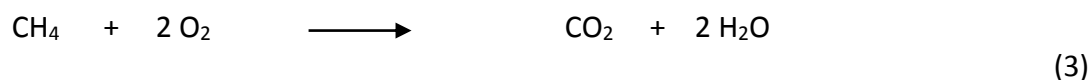
4.   Calculate the mass of iron oxide produced when 11.2g of iron reacts with excess oxygen.

$$4\ Fe \quad + \quad 3\ O_2 \longrightarrow \qquad\qquad 2\ Fe_2O_3$$

(3)

5.   When sodium reacts with water the alkali sodium hydroxide is produced and hydrogen gas. Calculate the mass of sodium needed to produce 120g of sodium hydroxide.

$$2Na \quad + \quad 2H_2O \longrightarrow \qquad 2NaOH \quad + \quad H_2$$

(3)