A level chemistry transition

Moles and equations

Section 1 – Moles

1. Calculate the Mr of each of the following substances:
    a. Carbon dioxide - CO_2 ....
    b. Ammonia - NH_3 ....
    c. Magnesium chloride - $MgCl_2$ ....
    d. Aluminium chloride - $AlCl_3$ ....
    e. Ethane - C_2H_6 ....
    f. Propanol - C_3H_7O ....
    g. Glucose - $C_6H_{12}O_6$ ....
    h. Alanine (An amino acid) - NH_2CHCH_3COOH .... (8)
2. How many moles are there if you had 10g of each of the following chemicals? following amounts?
    a. Ammonia ....
    b. Aluminium chloride ....
    c. Propanol ....
    d. Glucose .... (4)
3. How *many* of each species are there in the following questions.
    a. Atoms in 5 moles of water ....
    b. Ions in 0.5 moles of sodium chloride ....
   c. Cations in 1 mole of phosphoric acid (H_3PO_4) .... (3)

Section 2 – Using equations

4. Using the format presented in the PowerPoint calculate the desired amount of the chemical in the question. Remember units of mass do not need converting.
    a. What mass of hydrogen is needed to react with 40 g of copper oxide?
    $$CuO + H_2 \rightarrow Cu + H_2O$$

    (3)
    b. What mass of oxygen reacts with 192 g of magnesium?
    $$2Mg + O_2 \rightarrow 2MgO$$

    (3)
    c. What mass of sulphur trioxide is formed from 96 g of sulphur dioxide?
    $$2SO_2 + O_2 \rightarrow 2SO_3$$

    (3)

d. What mass of carbon monoxide is needed to react with 480 kg of iron oxide?

$$Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$$
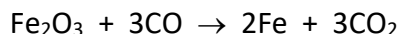
(3)

e. What mass of carbon dioxide is produced when 5.6 g of butene is burnt.

$$C_4H_8 + 6O_2 \rightarrow 4CO_2 + 4H_2O$$
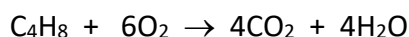
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f. What mass of oxygen is needed to react with 8.5 g of hydrogen sulphide (H_2S)?

$$2H_2S + 3O_2 \rightarrow 2SO_2 + 2H_2O$$
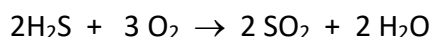
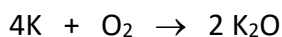(3)

g. The pollutant sulfur dioxide can removed from the air by reaction with calcium carbonate in the presence of oxygen. What mass of calcium carbonate is needed to remove 1 **kg** of sulfur dioxide?

$$2CaCO_3 + 2SO_2 + O_2 \rightarrow 2CaSO_4 + 2CO_2$$
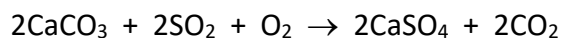
(3)

h. What mass of potassium oxide is formed when 7.8g of potassium is burned in oxygen?

$$4K + O_2 \rightarrow 2K_2O$$

(3)

Section 3 – Concentration

5. What is the concentration of each of the following in mol/dm^3?
    a. 5g of Nacl dissolved in 250cm^3 of water

(3)

b. 5g of sodium chloride dissolved in 25cm^3 of water

(3)

c. 0.5g of glucose dissolved in 500cm^3 of water

(3)

6. What mass of each of the following substance would you need to make the desired concentration? You will need to rearrange and use both equations covered in the PowerPoint in order to do these questions.

a. 500cm^3 of 1 mol/dm^3 solution of salt water (Sodium chloride)

(3)

b. 20 cm^3 of 0.5 mol/dm^3 glucose solution

(3)

c. 50 cm^3 of 2 mol/dm^3 solution of sodium hydroxide (NaOH)

(3)

d. 150 cm^3 of 10 mol/dm^3 solution of sodium hydroxide (NaOH)

(3)

Total: **/ 60**