Stoichiometry – 2021 IGCSE 0620

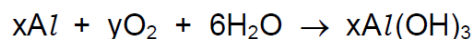1. June/2021/Paper_11,12&13/No.9
   What is the relative formula mass of magnesium nitrate, $Mg(NO_3)_2$?

   A 74   **B** 86   **C** 134   **D** 148

2. June/2021/Paper_12&22/No.11
   A reaction involving aluminium is shown.

   $$xAl + yO_2 + 6H_2O \rightarrow xAl(OH)_3$$

   Which values of x and y balance the equation?

	x	y
A	2	3
B	3	2
C	3	4
D	4	3

3. June/2021/Paper_13&23/No.11
   The equation for the decomposition of calcium carbonate is shown.

   $$CaCO_3 \rightarrow CaO + CO_2$$

   What mass of calcium oxide is produced when 10 g of calcium carbonate is heated?

   A 4.4 g   **B** 5.0 g   **C** 5.6 g   **D** 10.0 g

4. June/2021/Paper_21/No.9
   2.56 g of a metal oxide, MO_2, is reduced to 1.92 g of the metal, M.

   What is the relative atomic mass of M?

   A 48   **B** 96   **C** 128   **D** 192

5.
Chlorine gas will react with iron metal.

Exactly 21.3 g of chlorine reacts with 11.2 g of iron.

How many iron atoms react with 30 molecules of chlorine?

A   10   **B**   15   **C**   20   **D**   30

6.
Gas syringe X contains $100 \, cm^3$ of hydrogen bromide gas, HBr.

Gas syringe Y contains $100 \, cm^3$ of carbon dioxide gas. The volume of each gas is measured at room temperature and pressure.

Which statement is correct?

A   The mass of HBr is less than the mass of CO_2.

B   The number of molecules of HBr equals the number of molecules of CO_2.

C   The gas in syringe X contains more atoms than the gas in syringe Y.

D   The number of moles of HBr is more than the number of moles of CO_2.

7.
How much hydrogen is needed to react completely with 0.02 moles of butene to make butane?

A $0.24 \, dm^3$ **B** $0.48 \, dm^3$ **C** $0.96 \, dm^3$ **D** $1.20 \, dm^3$

8.
A compound has the formula XF_2 and has a relative mass of 70.

What is element X?

A   gallium

B   germanium

C   sulfur

D   ytterbium

9.

Sodium hydrogencarbonate is found in baking powder.

When sodium hydrogencarbonate is heated it forms three products.

$$2NaHCO_3 \rightarrow Na_2CO_3 + H_2O + CO_2$$

(a) Name the type of reaction that takes place when sodium hydrogencarbonate reacts in this way.

.... [1]

(b) Calculate the volume of carbon dioxide formed at room temperature and pressure when 12.6 g of $NaHCO_3$ is heated using the following steps:

- determine the mass of one mole of $NaHCO_3$

.... g

- calculate the number of moles of $NaHCO_3$ used

.... moles

- determine the number of moles of carbon dioxide formed

.... moles

- calculate the volume of carbon dioxide formed at room temperature and pressure.

.... dm^3
[4]

(c) Limewater is aqueous calcium hydroxide. Carbon dioxide turns limewater milky because a white precipitate forms.

Write the formula of:

- calcium hydroxide ....

- the white precipitate that forms when limewater turns milky. ....
[2]

[Total: 7]