AQA - Quantitative Chemistry – GCSE Chemistry Paper_3
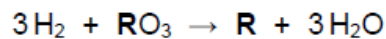
1.

1	0

This question is about the extraction of metals.

Element **R** is extracted from its oxide by reduction with hydrogen.

The equation for the reaction is:

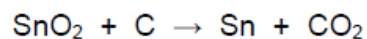$$3H_2 + RO_3 \rightarrow R + 3H_2O$$

1	0	.	1

The sum of the relative formula masses (M_r) of the reactants ($3H_2 + RO_3$) is 150

Calculate the relative atomic mass (A_r) of **R**.

Relative atomic masses (A_r):   H = 1   O = 16

[2 marks]

_____

_____

_____

_____

Relative atomic mass (A_r) of **R** = _____

2. June/2021/Paper_1H/No.3(3.3)

| 0 | 3 |.| 3 | Carbon is used to extract tin (Sn) from tin oxide (SnO_2).

The equation for the reaction is:

$$SnO_2 + C \rightarrow Sn + CO_2$$

Calculate the percentage atom economy for extracting tin in this reaction.

Relative atomic masses (A_r):   C = 12   O = 16   Sn = 119

[3 marks]
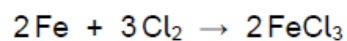
Percentage atom economy = _____ %

3. June/2021/Paper_1H/No.5(5.6)

| 0 | 5 |.| 6 | Iron chloride is produced by heating iron in chlorine gas.

The equation for the reaction is:

$$2\,Fe \; + \; 3\,Cl_2 \; \longrightarrow \; 2\,FeCl_3$$

Calculate the volume of chlorine needed to react with 14 g of iron.

You should calculate:

- the number of moles of iron used

- the number of moles of chlorine that react with 14 g of iron

- the volume of chlorine needed.

Relative atomic mass (A_r):   Fe = 56

The volume of 1 mole of gas = 24 dm^3

[3 marks]

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Volume of chlorine = _____ dm^3

4. June/2021/Paper_1H/No.7(7.8)

| 0 | 7 | . | 8 |

Determine the number of atoms of copper produced when copper nitrate solution is electrolysed for 20 minutes at a current of 0.6 A

Give your answer to 3 significant figures.

Use **Figure 5**.

Relative atomic mass (A_r):   Cu = 63.5

The Avogadro constant = 6.02×10^{23} per mole

[3 marks]

_____

_____

_____

_____

_____

_____

Number of atoms (3 significant figures) = _____

5. June/2021/Paper_1H/No.8(8.2)

| 0 | 8 | . | 2 | Calculate the volume of oxygen required to react with 50 cm^3 of hydrogen sulfide.

[1 mark]

_____

_____

Volume = _____ cm^3

5. June/2021/Paper_1H/No.8(8.2)

6. June/2021/Paper_1H/No.9(9.4_9.5)

0 9 . 4 Ethanedioic acid is a solid at room temperature.

Calculate the mass of ethanedioic acid ($H_2C_2O_4$) needed to make 250 cm³ of a solution with concentration 0.0480 mol/dm³

Relative formula mass (M_r): $H_2C_2O_4 = 90$

[2 marks]

_____

_____

_____

_____

Mass = _____ g

0 9 . 5 The student found that 25.0 cm³ of the sodium hydroxide solution was neutralised by 15.00 cm³ of the 0.0480 mol/dm³ ethanedioic acid solution.

The equation for the reaction is:

$$H_2C_2O_4 + 2\,NaOH \rightarrow Na_2C_2O_4 + 2\,H_2O$$

Calculate the concentration of the sodium hydroxide solution in mol/dm³

[3 marks]

_____

_____

_____

_____

_____

Concentration = _____ mol/dm³