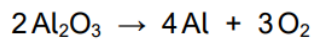


(Relative formula mass (Mr))

Q1. (2019)

The overall equation for the electrolysis of aluminium oxide is:



Calculate the mass of oxygen produced when 2000 kg of aluminium oxide is completely electrolysed.

Relative atomic masses (A_r): O = 16 Al = 27**[4 marks]**

Mass of oxygen = _____ kg

Q2. (2020)

The student used a solution of citric acid to determine the concentration of a solution of sodium hydroxide by titration.

The student made 250 cm^3 of a solution of citric acid of concentration 0.0500 mol/dm^3

Calculate the mass of citric acid ($\text{C}_6\text{H}_8\text{O}_7$) required.

Relative atomic masses (A_r): H = 1 C = 12 O = 16

[3 marks]

Mass = _____ g

Q3. (2022)

Calculate the minimum mass in grams of magnesium needed to completely reduce 1.2 kg of silicon dioxide.

Relative atomic masses (A_r): O = 16 Mg = 24 Si = 28

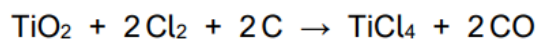
[5 marks]

Minimum mass of magnesium = _____ g

Q4. (2023)

Titanium is extracted from titanium dioxide in a two-stage process.

The equation for the first stage in the process is:



Calculate the volume of chlorine gas needed to react completely with 100 kg of titanium dioxide.

Relative atomic masses (A_r): O = 16 Ti = 48

The volume of one mole of gas = 24 dm³

[6 marks]

Volume = _____ dm³

Calculate the percentage (%) by mass of iron in Fe_3O_4

Relative atomic masses (A_r): O = 16 Fe = 56

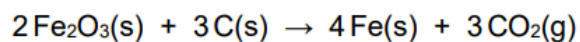
[3 marks]

Percentage by mass of iron = _____ %

Q6. (2024)

Fe_2O_3 reacts with carbon to produce carbon dioxide.

The equation for the reaction is:



Calculate the volume of carbon dioxide gas at room temperature and pressure that is produced from 40.0 kg of Fe_2O_3 using excess carbon.

Relative formula mass (M_r): $\text{Fe}_2\text{O}_3 = 160$

The volume of 1 mole of any gas at room temperature and pressure is 24 dm³.

[5 marks]

Volume of carbon dioxide = _____ dm³