

1.2 Reacting Masses & Volumes

Question Paper

Course	DP IB Chemistry
Section	1. Stoichiometric Relationships
Topic	1.2 Reacting Masses & Volumes
Difficulty	Easy

Time allowed: 20

Score: /10

Percentage: /100

When calcium carbonate is heated it decomposes according to the following equation

$$CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$$

If 6.00g of calcium carbonate is heated and produces 2.73g of calcium oxide, what is the percentage yield of calcium oxide? (M_r CaCO₃ = 100; CaO = 56)

A
$$\frac{56 \times 6.00 \times 100}{2.73}$$

$$B \qquad \frac{2.73 \times 100 \times 100}{56 \times 6.00}$$

c
$$\frac{56 \times 6.00 \times 100}{2.73 \times 100}$$

D
$$\frac{2.73 \times 100}{56 \times 6.00}$$

Hydrogen and chlorine react according to the following equation

$$H_2(g) + Cl_2(g) \rightarrow 2HCl(g)$$

When 1.5 moles of chlorine reacts with 2.0 moles of hydrogen, what will be the result?

- A 3.5 mol of HCl
- **B** 1.5 mol of HCl and 0.5 mol of H_2
- C 2.0 mol of HCl and 0.5 mol of Cl₂
- **D** 3.0 mol of HCl and 0.5 mol of H₂

25.0 cm³ of hydrochloric acid solutions reacts with 36.2 cm³ of 0.225 mol dm⁻³ sodium hydroxide solution. The concentration of the acid is

- A $\frac{36.2 \times 0.225}{25.0}$
- $\mathbf{B} \qquad \frac{25.0 \times 0.225}{36.2}$
- **c** $\frac{25.0 \times 0.225}{1000 \times 36.2}$
- $\mathbf{D} \qquad \frac{36.2 \times 0.225}{1000 \times 25.0}$

[1 mark]

Question 4

Which amount of the following substances contains the smallest quantity of ions?

- A 2 mol of KOH
- **B** 1 mol of NH₄Br
- C 2 mol of MgCl₂
- **D** 1 mol of Fe_2O_3

A solution of sodium chloride is made by adding 300 cm³ of water to a flask containing 200 cm³ of 0.5 mol dm⁻³ sodium chloride. What is the concentration of the resulting solution?

- **A** 0.05 mol dm⁻³
- **B** 0.1 mol dm⁻³
- **C** 0.2 mol dm⁻³
- **D** 0.3 mol dm⁻³

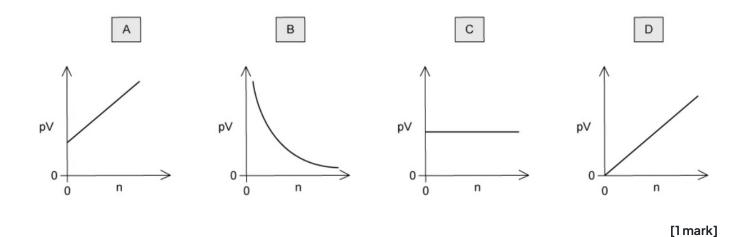
[1 mark]

Question 6

What is the number of molecules in 500 cm³ of oxygen under standard conditions?

- **A** $6.02 \times 10^{23} \times 0.5$
- **B** 6.02 x 10²³ x 500
- C $\frac{22.7}{0.5}$ x 6.02 x 10^{23}
- $\frac{0.5}{22.7} \times 6.02 \times 10^{23}$

For an ideal gas at constant pressure and temperature, which diagram shows the correct graph of *p*V against n?



Question 8

The M_r value of a gas can be calculated from the ideal gas equation.

Which expression will give the value of M_r for a sample of a gas of mass m in grams?

$$\mathbf{A}$$
 $M_r = rac{mRT}{pV}$ \mathbf{B} $M_r = rac{pVRT}{m}$ \mathbf{C} $M_r = rac{mpV}{RT}$ \mathbf{D} $M_r = rac{pV}{mRT}$

Which of the following least resembles an ideal gas at room temperature?

- A helium
- **B** ammonia
- C carbon dioxide
- **D** hydrogen

[1 mark]

Question 10

The ideal gas equation below summarises the gas laws.

$$pV = nRT$$

Which statement below is correct?

- A there exist intermolecular forces of attraction between gas molecules
- **B** ideal gas molecules will collide inelastically upon impact with each other
- c one mole of an ideal gas occupies the same volume under the same conditions of temperature and pressure
- **D** the volume of a given mass of an ideal gas is doubled if its temperature is raised from 25 °C to 50 °C