Chemistry
As - LEVEL

CAMBRIDGE UNIVERSITY EXAMINATIONS

General Certificate of Education Advanced Subsidiary Level
and Advanced Level (As Level and A Level)
Paper 1 Multiple Choice Questions(MCQs)

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Chapter 7

States of Matter

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1 What is the volume of steam produced when 1.00 g of ice is heated to 323 °C at a pressure of 101 kPa?

A 0.27 dm^3 **B** 1.3 dm^3 **C** 2.7 dm^3 **D** 48 dm^3

C

2 Measured values of the pressure, volume and temperature of a known mass of a gaseous compound are to be substituted into the equation

$$pV = nRT$$

in order to calculate the relative molecular mass, M_r, of the compound.

Which conditions of pressure and temperature would give the most accurate value of M_r?

	pressure	temperature
A	high	high
B	high	low
C	low	high
D	low	low

C

3 Which of the following least resembles an ideal gas?

A ammonia

B helium

C hydrogen

D trichloromethane

A

4 Which gas closely approaches ideal behaviour at room temperature and pressure?

A ammonia

B carbon dioxide

C helium

D oxygen

C

5 The density of ice is 1.00 g cm^{-3}.

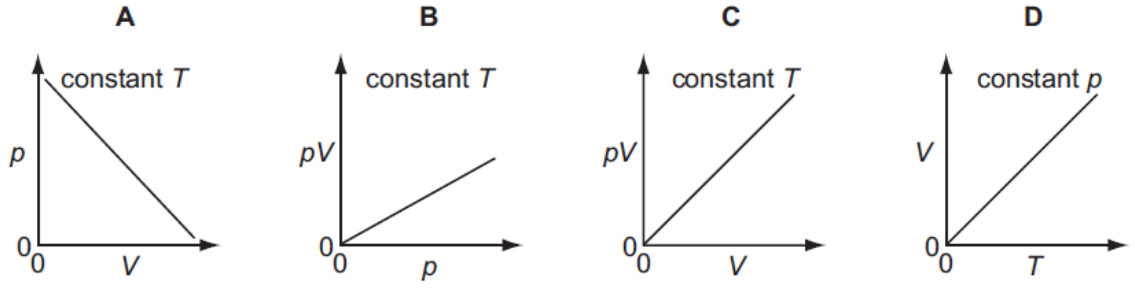
What is the volume of steam produced when 1.00 cm^3 of ice is heated to 323 °C (596 K) at a pressure of one atmosphere (101 kPa)?

[1 mol of a gas occupies 24.0 dm^3 at 25 °C (298 K) and one atmosphere.]

A 0.267 dm^3 **B** 1.33 dm^3 **C** 2.67 dm^3 **D** 48.0 dm^3

C

6 Which diagram correctly describes the behaviour of a fixed mass of an ideal gas? (*T* is measured in K.)



D

7 Which mass of gas would occupy a volume of 3 dm^3 at 25 °C and 1 atmosphere pressure? [1 mol of gas occupies 24 dm^3 at 25 °C and 1 atmosphere pressure.]

A 3.2 g O_2 gas

B 5.6 g N_2 gas

C 8.0 g SO_2 gas

D 11.0 g CO_2 gas

C

8 *Use of the Data Booklet is relevant to this question.*

The gas laws can be summarised in the ideal gas equation.

$$pV = nRT$$

0.96 g of oxygen gas is contained in a glass vessel of volume 7000 cm^3 at a temperature of 30 °C.

What is the pressure in the vessel?

A 1.1 kPa **B** 2.1 kPa **C** 10.8 kPa **D** 21.6 kPa

C

9 Ethanol has a boiling point of 78 °C. At 101 kPa and 79 °C ethanol vapour does not perfectly obey the gas equation $pV = nRT$.

What is the reason for this?

A Ethanol vapour is in equilibrium with ethanol liquid at 79 °C.

B There are intermolecular forces between the molecules of ethanol vapour.

C The vapourisation of ethanol liquid is an endothermic process.

D Vapours will not obey the gas equation perfectly at such a low pressure.

B

10 Which would behave the **least** like an ideal gas at room temperature?

A carbon dioxide

B helium

C hydrogen

D nitrogen

A

11	The general gas equation can be used to calculate the M_r value of a gas. For a sample of a gas of mass m g, which expression will give the value of M_r? **A** $M_r = \frac{mpV}{RT}$ **B** $M_r = \frac{pVRT}{m}$ **C** $M_r = \frac{mRT}{pV}$ **D** $M_r = \frac{pV}{mRT}$	C
12	Which **least** resembles an ideal gas at room temperature and pressure? **A** ammonia **B** helium **C** hydrogen **D** methane	A
13	*Use of the Data Booklet is relevant to this question.* When 0.15 g of an organic compound is vaporised, it occupies a volume of 65.0 cm^3 at 405 K and 1.00×10^5 Nm^{-2}. Using the expression $pV = nRT$, which of the following expressions should be used to calculate the relative molecular mass, M_r, of the compound? **A** $\frac{0.15 \times 65 \times 10^{-6} \times 1 \times 10^5}{8.31 \times 405}$ **B** $\frac{0.15 \times 8.31 \times 405}{1 \times 10^5 \times 65 \times 10^{-3}}$ **C** $\frac{0.15 \times 65 \times 10^{-3} \times 1 \times 10^5}{8.31 \times 405}$ **D** $\frac{0.15 \times 8.31 \times 405}{1 \times 10^5 \times 65 \times 10^{-6}}$	D
14	Which compound is the only gas at room temperature and pressure? **A** $CH_3CH_2CH_2NH_2$ $M_r = 59.0$ **B** $CH_3CH_2CH_2OH$ $M_r = 60.0$ **C** CH_2OHCH_2OH $M_r = 62.0$ **D** CH_3CH_2Cl $M_r = 64.5$	D
15		
16		
17		
18		
19		
20		