

IGCSE Chemistry

Paper 4

Unsolved Topical

Past Papers with Mark Scheme

All Variants

2014-2021

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PREFACE

Excellence in learning cannot be claimed without application of concepts in a dexterous way. In this regard one of the logical approach is to start in chunks; like chapter wise learning and applying the concept on exam based questions.

This booklet provides an opportunity to candidates to practice topic wise questions from previous years to the latest. Extensive working of Team MS Books has tried to take this booklet to perfection by collaborating with top of the line teachers.

We have added answer key / marks scheme at the end of each topic for the candidate to compare the his/her answer to the best.

MS Books strives to maintain actual spacing between consecutive questions and within options as per CAIE format which gives students a more realistic feel of attempting question.

Review, feedback and contribution in this booklet by various competent teachers of a subject belonging to renowned school chains make it most valuable resource and tool for both teachers and students.

With all belief in strength of this resource material I can confidently claim that it is worth in achieving brilliance.

Our sincere thanks and gratification to **Mr. Kamal Ahmad** who took out special time to help compile and manage this booklet. We would also like to appreciate chemistry faculty for reviewing and indorsing it.

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IGCSE CHEMISTRY

Paper 4

CONTENT TABLE

Sr #	TOPICS	Pg #
1.	State of Matter	7
2.	Atoms, Elements & Compounds	
	2.1 Structure of Matter (Element,Mixtures,Compounds,Alloys)	24
	2.2 Atomic Structure	27
	2.4 Ions and Ionic Bonding	50
	2.5 Molecules and Covalent Bonds	75
	2.6 Macro Molecules	95
	2.7 Metallic Bonding	102
3.	Stoichiometry	104
4.	Electrochemistry	163
5.	Chemical Energetics	213
6.	Chemical Reactions	
	6.2 Rate of Reaction	231
	6.3 Reversible Reactions and Equilibrium	258
	6.4 Redox	282
7.	Acids, Bases & Salts	
	7.1 The Characteristic Properties of Acids and Bases	289
	7.2 Oxides	301
	7.3 Preparation of Salts	308
8.	The Periodic Table	331
9.	Metals	357
10.	Chemistry Of Environment	403
11.	Organic Chemistry	
	11.3 Fuels	428
	11.4 Alkanes	431
	11.5 Alkenes	449
	11.6 Alcohols	469
	11.7 Carboxylic Acids	498
	11.8 Polymers	526
12.	Experimental Techniques & Chemical Analytics	
	12.3 Chromatography	561
	12.4 Separation and Purification	566
	12.5 Identification of Ions & Gases	571
13.	Multi-Topic/Challenging Questions	582

STATES OF MATTER

Q3/31/M/J/14

1 (a) Different gases diffuse at different speeds.

(i) What is meant by the term *diffusion*?

.....
..... [1]

(ii) What property of a gas molecule affects the speed at which it diffuses?

..... [1]

(b) Helium is a gas used to fill balloons. It is present in the air in very small quantities. Diffusion can be used to separate it from the air.

Air at 1000 °C is on one side of a porous barrier. The air which passes through the barrier has a larger amount of helium in it.

(i) Why does the air on the other side of the barrier contain more helium?

..... [1]

(ii) Why is it an advantage to have the air at a high temperature?

.....
..... [1]

(c) Most helium is obtained from natural gas found in the USA. Natural gas contains methane and 7% helium. One possible way to obtain the helium would be to burn the methane.

(i) Write an equation for the complete combustion of methane.

..... [1]

(ii) Suggest why this would **not** be a suitable method to obtain the helium.

.....
..... [1]

(iii) Suggest another method, other than diffusion, by which helium could be separated from the mixture of gases in natural gas.

..... [1]

[Total: 7]

Q6(c)/31/M/J/15

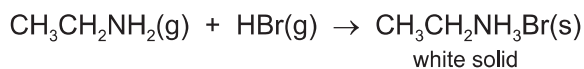
2 (c) Gases diffuse, which means that they move to occupy the total available volume.

(i) Explain, using kinetic particle theory, why gases diffuse.

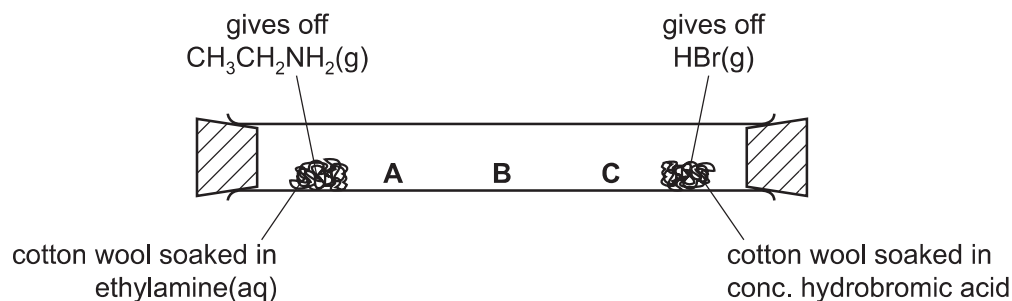
.....

 [2]

(ii) When the colourless gases hydrogen bromide and ethylamine come into contact, a white solid is formed.



The following apparatus can be used to compare the rates of diffusion of the two gases ethylamine and hydrogen bromide.



Predict at which position, **A**, **B** or **C**, the white solid will form. Explain your choice.

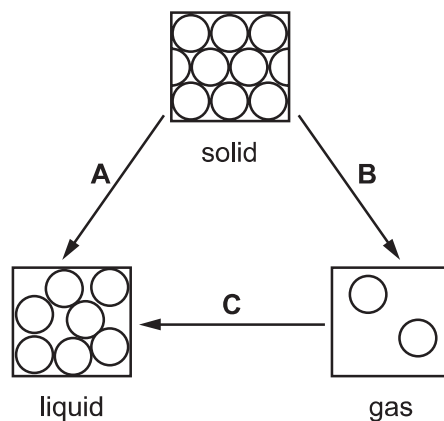
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 [3]

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Q2/41/O/N/16

3 Matter can exist as solid, liquid or gas. The arrows show some changes of state.



(a) Name the changes of state represented on the diagram.

(i) A [1]

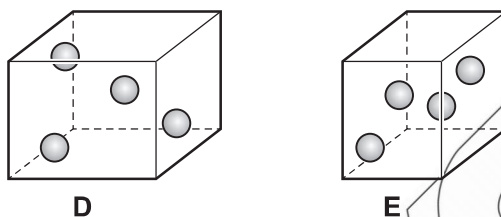
(ii) B [1]

(iii) C [1]

(b) Explain why energy has to be supplied to turn a liquid into a gas.

.....
 [1]

(c) The diagrams represent the same number of particles of a gas in two containers, D and E, which have different volumes. The two containers are at the same temperature.



In which container will the pressure be higher? Explain your answer.

.....

 [1]

[Total: 5]

Q1/42/O/N/16

4 Particles behave differently when in different physical states.

- (a) Solids have a fixed volume and a definite shape.
Gases have no fixed volume and take the shape of the container.

Describe the volume and shape of liquids.

.....
..... [1]

- (b) Complete the table to show the separation, arrangement and movement of particles in each physical state.

state	separation of particles	arrangement of particles	movement of particles
solid			
liquid	touching one another	randomly arranged	move over one another
gas			

[6]

- (c) Name the following changes of state.

- (i) Ice turning into water.

..... [1]

- (ii) Solid carbon dioxide turning directly into gaseous carbon dioxide at room temperature.

..... [1]

[Total: 9]

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BOOKS

Q1(a,b,c)/42/O/N/21

11 This question is about states of matter.

- (a) Complete the table, using ticks (✓) and crosses (✗), to describe the properties of gases, liquids and solids.

state of matter	particles are touching	particles have random movement	particles are regularly arranged
gas			
liquid			
solid			

[3]

- (b) Substances can change state.

- (i) Boiling and evaporation are two ways in which a liquid changes into a gas.

Describe **two** differences between boiling and evaporation.

1

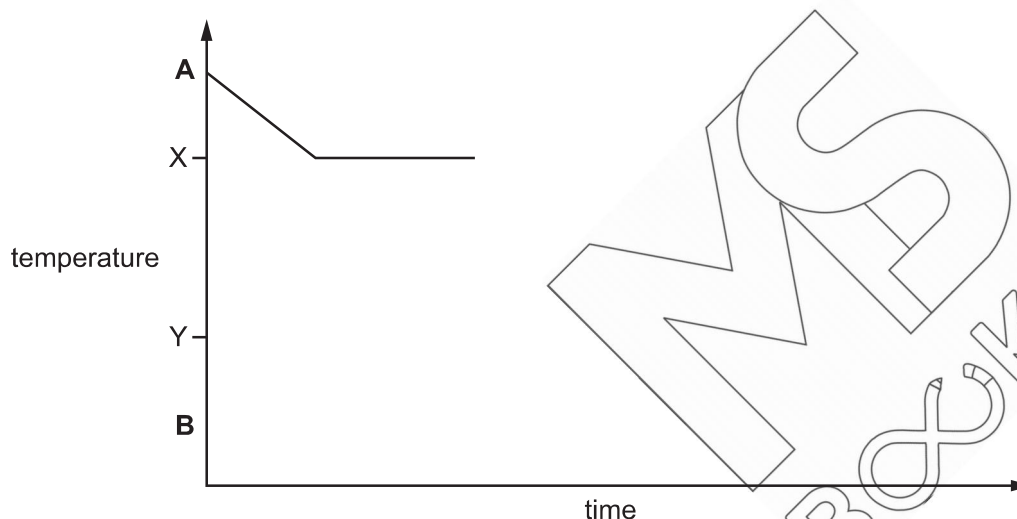
2 [2]

- (ii) Name the change of state when:

- a gas becomes a liquid
- a solid becomes a gas. [2]

- (c) A substance boils at temperature X and melts at temperature Y.

Complete the graph to show the change in temperature over time as the substance cools from temperature A to temperature B.

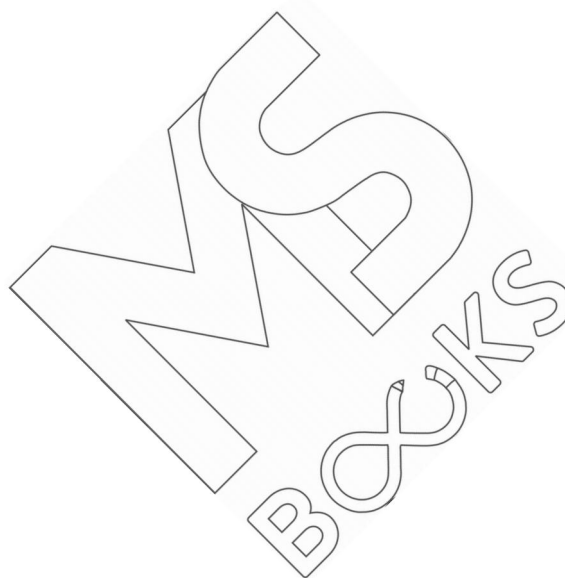


[2]

Q3/31/M/J/14

- 1 (a) (i) (particles) spread to fill total available volume/move from high concentration to low concentration/moves down a concentration gradient (1) [1]
- (ii) mass or M_r (1) [1]
- (b) (i) helium atoms/molecules are lighter than molecules in air or N_2 **and** O_2
or helium is less dense than air or N_2 **and** O_2 .
or helium diffuses (through the porous barrier) faster than air or N_2 **and** O_2 . (1) [1]
- (ii) faster rate of diffusion/molecules move faster (at high temperatures). (1) [1]
- (c) (i) $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$ (1) [1]
- (ii) would get a mixture of helium and carbon dioxide
or would get a mixture of gases
or waste of methane/natural gas/fossil fuel (1) [1]
- (iii) fractional distillation (1) [1]

[Total: 7]



Q6(c)/31/M/J/15 Q 2

6(c)(i)	Any two from: (particles move in) random motion; (particles) collide; (particles) move from a region of high concentration to low concentration;		A alternative phrases for collide A down a concentration gradient
6(c)(ii)	C; M2 it has a lower (relative) molecular mass (than HBr); M3 ethylamine diffuses faster (than HBr);	2 3	A ethylamine is less dense A ethylamine is a lighter molecule but I 'ethylamine is lighter' I ethylamine is a smaller molecule A ethylamine molecules or particles move faster A ECF for M2 and M3 if A is given e.g. HBr diffuses faster for M3 because it is a lighter molecule for M2 A ECF for M2 if B is given e.g. they diffuse at same rate for M3 because molecules weigh the same for M2

Q2/41/O/N/16 Q 3

Question	Answer	Marks
2(a)(i)	melt(ing)	1
2(a)(ii)	sublimation /sublime	1
2(a)(iii)	condensing/condensation	1
2(b)	overcome /break the attractive forces	1
2(c)	E AND particles hit the walls (of the container) more often	1