IGCSE Cambridge Topical Past Papers

CHEMISTRY

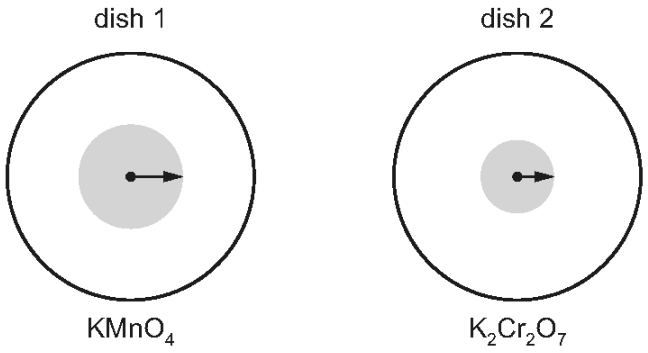
0620 Paper 2

2017 — 2023

1 - (0620/21_Summer_2017_Q1) - *States Of Matter*

Small crystals of purple $KMnO_4$ (M_r = 158) and orange $K_2Cr_2O_7$ (M_r = 294) were placed at the centres of separate petri dishes filled with agar jelly. They were left to stand under the same physical conditions.

After some time, the colour of each substance had spread out as shown.



The lengths of the arrows indicate the relative distances travelled by particles of each substance.

Which statement is correct?

A Diffusion is faster in dish 1 because the mass of the particles is greater.

B Diffusion is faster in dish 2 because the mass of the particles is greater.

C Diffusion is slower in dish 1 because the mass of the particles is smaller.

D Diffusion is slower in dish 2 because the mass of the particles is greater.

2 - (0620/21_Winter_2017_Q1) - *States Of Matter*

Which process causes the greatest increase in the distance between particles?

A condensation

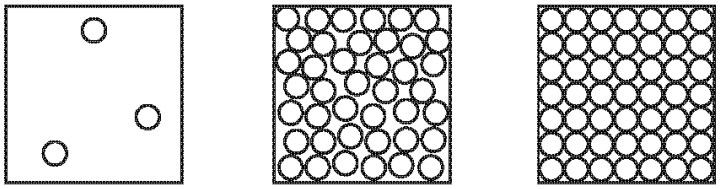
B freezing

C melting

D sublimation

3 – (0620/22_Winter_2017_Q1) – *States Of Matter*

The diagram shows the arrangement of particles in the three states of matter.



Solid carbon dioxide (dry ice) sublimes to gaseous carbon dioxide.

Which row describes the initial and final states?

	initial state	final state
A	P	R
B	Q	P
C	R	P
D	R	Q

4 – (0620/21_Winter_2018_Q1) – *States Of Matter*

When smoke particles are observed with a microscope they are seen to move around randomly. This is called Brownian motion.

What causes Brownian motion?

A diffusion of the smoke particles

B molecules in the air hitting the smoke particles

C sublimation of the smoke particles

D the smoke particles hitting the walls of the container

5 – (0620/22_Winter_2018_Q1) – *States Of Matter*

Oxygen and fluorine are gaseous elements next to each other in the Periodic Table.

Under the same conditions of temperature and pressure, oxygen diffuses .....1..... than fluorine because its .....2..... is less than that of fluorine.

Which words correctly complete gaps 1 and 2?

	1	2
A	faster	molecular mass
B	faster	reactivity
C	slower	molecular mass
D	slower	reactivity

6 – (0620/23_Winter_2018_Q1) – *States Of Matter*

Gases are separated from liquid air by fractional distillation. The boiling points of four gases are shown.

Which gas is both monatomic and a liquid at –200 °C?

	gas	boiling point / °C
A	argon	–186
B	helium	–269
C	neon	–246
D	nitrogen	–196

7 – (0620/21_Summer_2019_Q1) – *States Of Matter*

Which statement explains why ammonia gas, NH_3, diffuses at a faster rate than hydrogen chloride gas, HCl?

A Ammonia expands to occupy all of the space available.

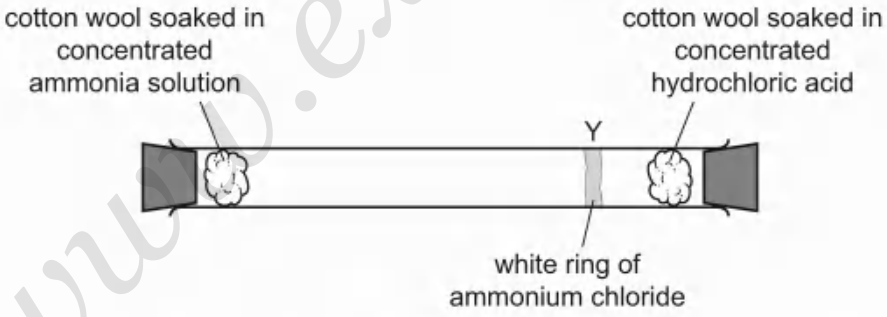
B Ammonia has a smaller relative molecular mass than hydrogen chloride.

C Ammonia is an alkali and hydrogen chloride is an acid.

D Ammonia molecules diffuse in all directions at the same time.

8 – (0620/22_Summer_2019_Q1) – *States Of Matter*

The apparatus shown is set up. After 20 minutes a white ring of ammonium chloride is seen at position Y.



Which statement about the molecules of ammonia and hydrogen chloride is correct?

A Molecules in ammonia have a larger M_r than molecules of hydrogen chloride and so they move more slowly.

B Molecules in ammonia have a larger M_r than molecules of hydrogen chloride and so they move more quickly.

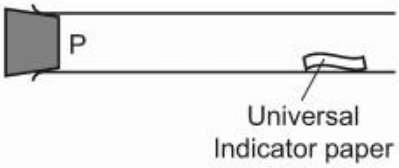
C Molecules in ammonia have a smaller M_r than molecules of hydrogen chloride and so they move more slowly.

D Molecules in ammonia have a smaller M_r than molecules of hydrogen chloride and so they move more quickly.

9 – (0620/23_Summer_2019_Q1) – *States Of Matter*

Hydrogen chloride gas (M_r = 36.5) is released at P in the apparatus shown.

The Universal Indicator paper turns red after 38 s.



The experiment is repeated using sulfur dioxide (M_r = 64).

What is the result for sulfur dioxide?

	Universal Indicator turns	time for Universal Indicator to change colour / s
A	blue	26
B	blue	51
C	red	26
D	red	51

10 – (0620/21_Winter_2019_Q1) – *States Of Matter*

Samples of four gases are released in a room at the same time.

The gases are carbon dioxide, CO_2, hydrogen chloride, HCl, hydrogen sulfide, H_2S, and nitrogen dioxide, NO_2.

Which gas diffuses fastest?

A carbon dioxide

B hydrogen chloride

C hydrogen sulfide

D nitrogen dioxide

11 – (0620/22_Winter_2019_Q1) – *States Of Matter*

The rate of diffusion of a gas depends on its molecular mass and the temperature.

Which combination of molecular mass and temperature gives the slowest rate of diffusion?

	molecular mass	temperature
A	high	high
B	high	low
C	low	high
D	low	low

ANSWERS

1 – (0620/21_Summer_2017_Q1) – *States Of Matter*

D

2 – (0620/21_Winter_2017_Q1) – *States Of Matter*

D

3 – (0620/22_Winter_2017_Q1) – *States Of Matter*

C

4 – (0620/21_Winter_2018_Q1) – *States Of Matter*

B

5 – (0620/22_Winter_2018_Q1) – *States Of Matter*

A

6 – (0620/23_Winter_2018_Q1) – *States Of Matter*

A

7 – (0620/21_Summer_2019_Q1) – *States Of Matter*

B

8 – (0620/22_Summer_2019_Q1) – *States Of Matter*

D

9 – (0620/23_Summer_2019_Q1) – *States Of Matter*

D

10 – (0620/21_Winter_2019_Q1) – *States Of Matter*

C