

TOPICAL PAST PAPER QUESTIONS WORKBOOK

IGCSE Chemistry (0620) Paper 1

May/June 2012 - October/November 2021



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Introduction

Each topical past paper questions workbook consists of hundreds of questions and their answer schemes, in the form of worksheets. Questions are assigned to each chapter according to their corresponding topic. Topics, in turn, are based on the items of the latest Cambridge IGCSE or AS/A level syllabus content. This book's specifications are as follows:

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Chapter 1

The particulate nature of matter

1.1 The particulate nature of matter

1. 0620_m21_qp_12 Q: 1

In which changes do the particles move further apart?



- A** W and X **B** W and Z **C** X and Y **D** Y and Z

2. 0620_s21_qp_11 Q: 1

Which row describes the arrangement and movement of particles in a liquid?

	arrangement of particles	movement of particles
A	touching and regular	vibrating
B	touching and random	moving around each other
C	touching and regular	moving around each other
D	touching and random	moving very fast

3. 0620_s21_qp_13 Q: 1

A 1 cm^3 sample of substance X is taken. This is sample 1.

X is then converted to a different physical state and a 1 cm^3 sample is taken. This is sample 2.

Sample 2 contains more particles in the 1 cm^3 than sample 1.

Which process caused this increase in the number of particles in 1 cm^3 ?

- A boiling of liquid X
- B condensation of gaseous X
- C evaporation of liquid X
- D sublimation of solid X

4. 0620_s21_qp_13 Q: 2

Solid carbon dioxide changes directly into a gas under suitable conditions of temperature and pressure.

Carbon dioxide gas moves from a high concentration to a low concentration.

Which row names these two processes?

	changing from solid to gas	moving from a high concentration to a low concentration
A	evaporation	Brownian motion
B	evaporation	diffusion
C	sublimation	Brownian motion
D	sublimation	diffusion

5. 0620_w21_qp_11 Q: 1

Decane has a freezing point of -30°C and a boiling point of 174°C .

A small sample of decane is placed in an open beaker in an oven at a temperature of 120°C and at atmospheric pressure for 24 hours.

What happens to the sample of decane?

- A It boils.
- B It evaporates.
- C It melts.
- D It sublimes.

6. 0620_w21_qp_12 Q: 1

Which row describes what happens to the particles in solid iodine when it is heated and turned into a gas?

	separation of particles	speed of particles
A	closer together	faster
B	closer together	slower
C	further apart	faster
D	further apart	slower

7. 0620_w21_qp_13 Q: 1

The particles in a substance are far apart, randomly arranged and moving.

The substance changes state and the particles are now close together. The particles are still randomly arranged and able to move.

What is the change of state of the substance?

- A** gas to liquid
- B** liquid to gas
- C** liquid to solid
- D** solid to gas

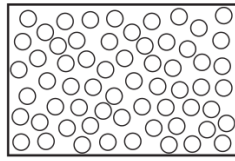
8. 0620_m20_qp_12 Q: 1

Which row represents the particles of a gas colliding most frequently?

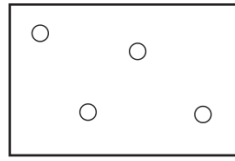
	pressure	temperature
A	high	high
B	high	low
C	low	high
D	low	low

9. 0620_p20_qp_10 Q: 1

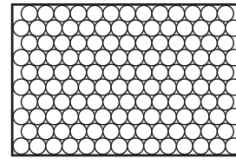
The diagrams show the arrangement of particles in three different physical states of substance X.



state 1



state 2



state 3

Which statement about the physical states of substance X is correct?

- A** Particles in state 1 vibrate about fixed positions.
- B** State 1 changes to state 2 by diffusion.
- C** State 2 changes directly to state 3 by condensation.
- D** The substance in state 3 has a fixed volume.

10. 0620_s20_qp_11 Q: 1

Nitrogen is heated in a balloon, which expands slightly.

Which statements about the molecules of nitrogen are correct?

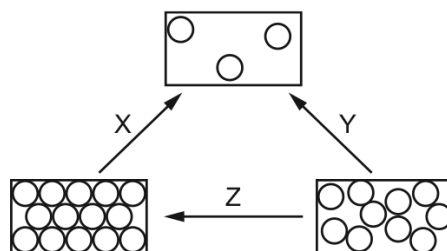
- 1 They move further apart.
- 2 They move more quickly.
- 3 They remain the same distance apart.
- 4 Their speed remains unchanged.

- A** 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

11. 0620_s20_qp_12 Q: 1

Each rectangle shows the arrangement of particles in each of the three states of matter.

X, Y and Z represent the processes needed to change from one state to another.



What are the processes X, Y and Z?

	X	Y	Z
A	evaporating	subliming	condensing
B	evaporating	subliming	freezing
C	subliming	evaporating	condensing
D	subliming	evaporating	freezing

12. 0620_s20_qp_13 Q: 1

Descriptions of the three states of matter are shown.

	particle separation	particle arrangement	type of motion
1	small	random	move past each other at low speed
2	large	random	rapid motion in straight lines
3	small	regular	vibration

Which row is correct?

	1	2	3
A	gas	liquid	solid
B	liquid	solid	gas
C	liquid	gas	solid
D	solid	gas	liquid

13. 0620_w20_qp_11 Q: 1

'The movement of a substance **very slowly** from an area of high concentration to an area of low concentration.'

Which process is being described?

- A** a liquid being frozen
 - B** a solid melting
 - C** a substance diffusing through a liquid
 - D** a substance diffusing through the air
-

14. 0620_w20_qp_11 Q: 2

What happens to the average speed of gas particles when pressure and temperature are increased?

	average speed of particles	
	pressure increases	temperature increases
A	faster	faster
B	unchanged	slower
C	slower	faster
D	unchanged	faster

15. 0620_w20_qp_12 Q: 1

'The movement of a substance **very slowly** from an area of high concentration to an area of low concentration.'

Which process is being described?

- A** a liquid being frozen
 - B** a solid melting
 - C** a substance diffusing through a liquid
 - D** a substance diffusing through the air
-

16. 0620_m19_qp_12 Q: 1

Four processes are listed.

- 1 Brownian motion
- 2 condensation
- 3 diffusion
- 4 evaporation

Which processes involve a change of state?

- A** 1 and 2 **B** 1 and 3 **C** 2 and 4 **D** 3 and 4

17. 0620_s19_qp_11 Q: 1

Sodium chloride is a liquid at 900 °C.

How are the particles arranged and how do the particles move in sodium chloride at 900 °C?

	arrangement of particles	motion of particles
A	regular	vibrate about a fixed point
B	regular	move randomly
C	random	vibrate about a fixed point
D	random	move randomly

18. 0620_s19_qp_12 Q: 1

Which row describes the arrangement and motion of particles in a solid?

	arrangement	motion
A	random	move in all directions
B	random	stay in one place
C	regular	move freely
D	regular	vibrate about a fixed point

19. 0620_s19_qp_13 Q: 1

Which row describes the arrangement and motion of the particles in a liquid?

	arrangement	motion
A	irregular and most particles touching	moving slowly
B	irregular spaces between all particles	moving slowly
C	regular and most particles touching	moving slowly
D	regular spaces between all particles	moving quickly

20. 0620_w19_qp_11 Q: 1

The diagram shows a cup of hot tea.



Which row describes the water particles in the air above the cup compared with the water particles in the cup?

	moving faster	closer together
A	✓	✗
B	✓	✓
C	✗	✗
D	✗	✓

21. 0620_m18_qp_12 Q: 1

Four physical changes are listed.

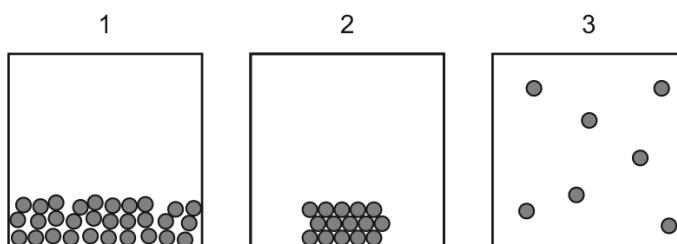
- 1 condensation
- 2 evaporation
- 3 freezing
- 4 sublimation

In which changes do the particles move further apart?

- A** 1 and 2 **B** 1 and 3 **C** 2 and 4 **D** 3 and 4

22. 0620_s18_qp_11 Q: 1

The diagrams show particles in a container.



Which two diagrams show the process of evaporation?

- A** 1 → 2 **B** 1 → 3 **C** 2 → 3 **D** 3 → 1

23. 0620_s18_qp_12 Q: 1

When iodine is heated it turns from a solid to a gas.

When liquid ammonia is cooled it turns into a solid.

When ice is heated it turns into water.

Which terms describe these changes of state?

	when iodine is heated	when liquid ammonia is cooled	when ice is heated
A	boiling	freezing	melting
B	freezing	sublimation	boiling
C	sublimation	condensation	freezing
D	sublimation	freezing	melting

24. 0620_w18_qp_11 Q: 1

A beaker containing solid carbon dioxide is placed in a fume cupboard at room temperature. The carbon dioxide becomes gaseous.

Which process describes this change of state?

- A** boiling
B condensation
C evaporation
D sublimation

25. 0620_w18_qp_11 Q: 2

The pressure of a sample of gas is decreased. The temperature is kept constant.

Which row describes the effects on the particles?

	movement of particles	collisions between particles
A	slower	occur less often
B	slower	occur with more force
C	no change in speed	occur less often
D	no change in speed	occur with more force

26. 0620_w18_qp_12 Q: 1

A gas is heated. The pressure is kept constant.

Which statement describes the behaviour of the particles in the gas?

- A** The particles move faster and become closer together.
- B** The particles move faster and become further apart.
- C** The particles move slower and become closer together.
- D** The particles move slower and become further apart.

27. 0620_w18_qp_12 Q: 2

In which state does 1 dm^3 of methane contain the most particles?

- A** gas at 100°C
- B** gas at room temperature
- C** liquid
- D** solid

28. 0620_w18_qp_13 Q: 1

The statements describe two changes of state.

- 1 The molecules of substance X are arranged randomly.
During the change of state, they lose energy and become more ordered. The molecules can still move freely.
- 2 The molecules of substance Y are arranged in a regular lattice.
During the change of state, they gain energy and become less ordered. The molecules are still close together.

Which changes of state are described by the statements?

	1	2
A	condensation	evaporation
B	condensation	melting
C	freezing	evaporation
D	freezing	melting

29. 0620_w18_qp_13 Q: 2

Which statement about gases is correct?

- A** Gases are difficult to compress when pressure is applied.
- B** The particles in gases are close together.
- C** The particles in gases have a random arrangement.
- D** The particles in gases move slowly past each other.

30. 0620_m17_qp_12 Q: 1

A bottle of aqueous ammonia is placed on a table in a corner of the laboratory.

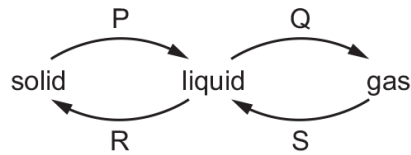
The stopper is removed and after a few minutes all the students in the room can smell the ammonia.

Which process occurs?

- A** Brownian motion
- B** diffusion
- C** dissolving
- D** distillation

31. 0620_s17_qp_11 Q: 1

The diagram shows some changes of state.



Which words describe the changes of state, P, Q, R and S?

	P	Q	R	S
A	freezing	boiling	melting	evaporation
B	melting	evaporation	freezing	condensation
C	melting	sublimation	freezing	evaporation
D	sublimation	evaporation	melting	condensation

32. 0620_s17_qp_12 Q: 1

Four statements about the arrangement of particles are given.

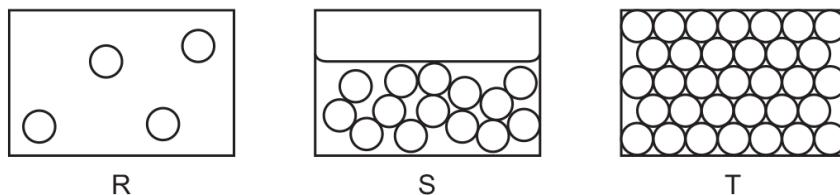
- 1 Particles are packed in a regular arrangement.
- 2 Particles are randomly arranged.
- 3 Particles move over each other.
- 4 Particles vibrate about fixed points.

Which statements describe the particles in a solid?

- A** 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

33. 0620_s17_qp_13 Q: 1

Diagrams R, S and T represent the three states of matter.

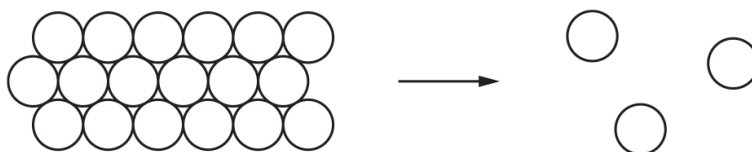


Which change occurs during freezing?

- A** R → S **B** S → T **C** T → R **D** T → S

34. 0620_w17_qp_11 Q: 1

The diagram shows how the arrangement of particles changes when a substance changes state.



Which change of state is shown?

- A boiling
- B condensation
- C evaporation
- D sublimation

35. 0620_w17_qp_12 Q: 1

The melting points and boiling points of four elements are shown.

element	melting point/°C	boiling point/°C
W	-7	60
X	-101	-34
Y	114	184
Z	39	688

In which elements do the particles vibrate about fixed positions at 0 °C?

- A W and X
- B W and Z
- C X and Y
- D Y and Z

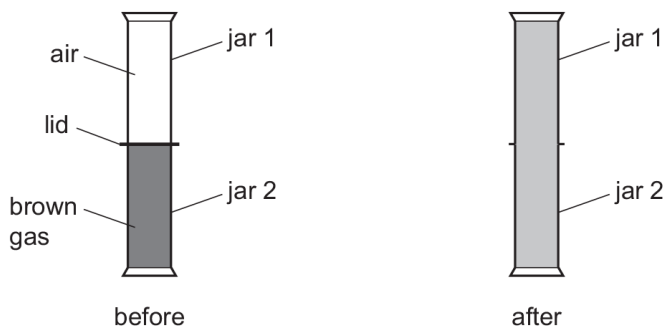
36. 0620_w17_qp_13 Q: 1

Which statement about liquids and gases is correct?

- A 1 cm³ of gas contains more particles than 1 cm³ of liquid.
- B A given mass of liquid has a fixed volume at room temperature.
- C Particles in a liquid can easily be forced closer together.
- D Particles in a liquid have fixed positions.

37. 0620_m16_qp_12 Q: 1

Two gas jars are set up as shown.



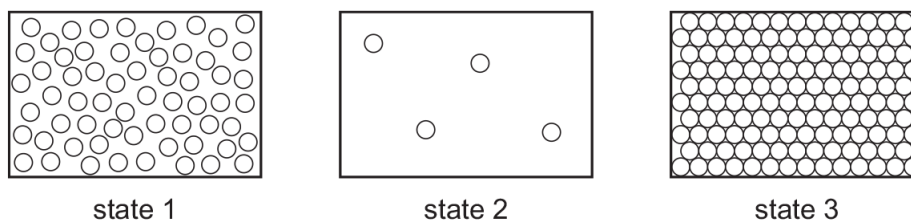
The lid is removed and the gas jars are left to stand. After some time the contents of both gas jars are brown.

Which process causes this to happen?

- A** condensation
- B** diffusion
- C** evaporation
- D** filtration

38. 0620_p16_qp_10 Q: 1

The diagrams show the arrangement of particles in three different physical states of substance X.



Which statement about the physical states of substance X is correct?

- A** Particles in state 1 vibrate about fixed positions.
- B** State 1 changes to state 2 by diffusion.
- C** State 2 changes directly to state 3 by condensation.
- D** The substance in state 3 has a fixed volume.

39. 0620_p16_qp_10 Q: 2

What is always true for a pure substance?

- A It always boils at 100 °C.
- B It contains only one type of atom.
- C It has a sharp melting point.
- D It is solid at room temperature.

40. 0620_s16_qp_11 Q: 1

In which changes do the particles move further apart?



- A W and X
- B W and Z
- C X and Y
- D Y and Z

41. 0620_w16_qp_11 Q: 1

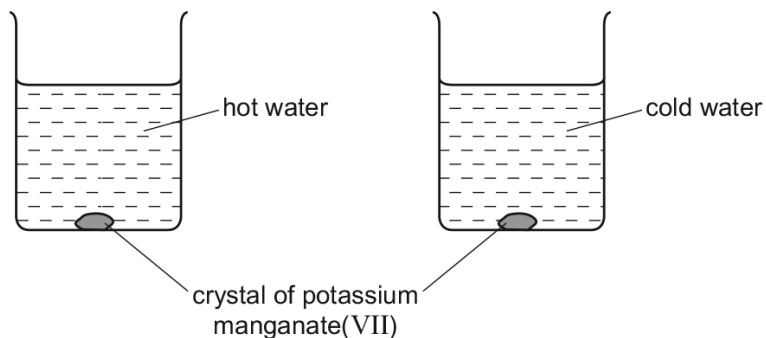
'Particles moving **very slowly** from an area of higher concentration to an area of lower concentration.'

Which process is being described?

- A a liquid being frozen
- B a solid melting
- C a substance diffusing through a liquid
- D a substance diffusing through the air

42. 0620_m15_qp_12 Q: 1

A crystal of purple potassium manganate(VII) was added to each of the beakers shown in the diagram.



One beaker contained hot water and the other beaker contained cold water.

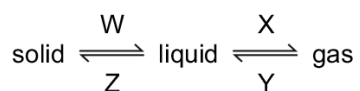
In both beakers the purple colour of the potassium manganate(VII) spreads out.

Which result and explanation are correct?

	result	explanation
A	colour spreads faster in cold water	particles move faster at a higher temperature
B	colour spreads faster in cold water	particles move slower at a higher temperature
C	colour spreads faster in hot water	particles move faster at a higher temperature
D	colour spreads faster in hot water	particles move slower at a higher temperature

43. 0620_s15_qp_11 Q: 1

The changes that occur when a substance changes state are shown below.



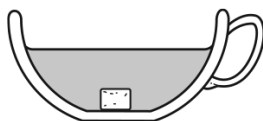
Which process, W, X, Y or Z, is occurring in the following four situations?

- 1 Butter melts on a warm day.
- 2 Water condenses on a cold surface.
- 3 The volume of liquid ethanol in an open beaker reduces.
- 4 Ice forms inside a freezer.

	1	2	3	4
A	W	X	Y	Z
B	W	Y	X	Z
C	X	Y	Z	W
D	X	Z	Y	W

44. 0620_s15_qp_12 Q: 1

The diagram shows a sugar lump in a cup of tea.



Which two processes must happen to spread the sugar evenly in the tea?

	first process	second process
A	diffusion	dissolving
B	dissolving	diffusion
C	dissolving	melting
D	melting	diffusion

45. 0620_s15_qp_13 Q: 1

A sugar cube is dropped into a hot cup of tea.

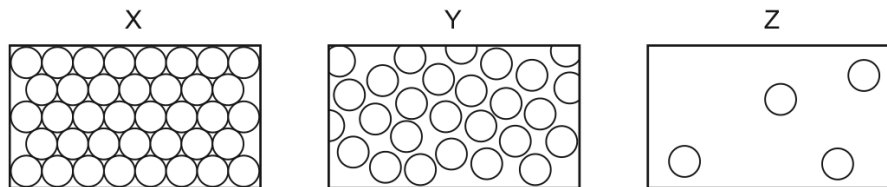
The tea is not stirred.

Which statement explains why the tea becomes sweet?

- A** The heated water molecules penetrate the sugar cube.
 - B** The hot tea causes the sugar to melt.
 - C** The sugar cube dissolves and its molecules diffuse.
 - D** The sugar molecules get hot and evaporate.
-

46. 0620_w15_qp_11 Q: 1

Diagrams X, Y and Z represent the three states of matter.



Which change occurs during boiling?

- A** X to Y
 - B** Y to Z
 - C** Z to X
 - D** Z to Y
-

47. 0620_w15_qp_12 Q: 1

Which change of state takes place during evaporation?

- A** gas to liquid
 - B** liquid to gas
 - C** liquid to solid
 - D** solid to gas
-

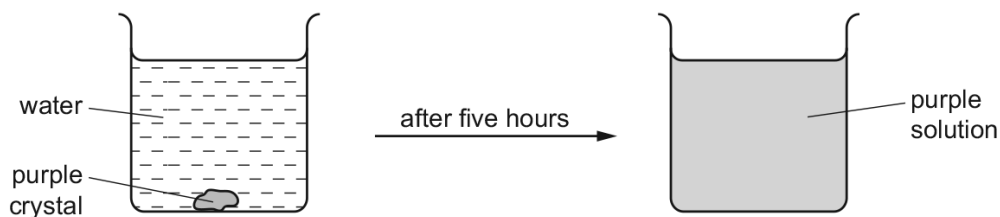
48. 0620_w15_qp_13 Q: 1

In which process do particles move closer together but remain in motion?

- A** condensation
 - B** diffusion
 - C** evaporation
 - D** freezing
-

49. 0620_s14_qp_11 Q: 1

The diagram shows the result of dropping a purple crystal into water.



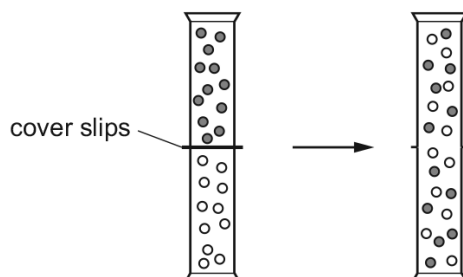
Which processes take place in this experiment?

	chemical reaction	diffusing	dissolving
A	✓	✓	✓
B	✓	✗	✓
C	✗	✗	✓
D	✗	✓	✓

50. 0620_s14_qp_12 Q: 1

Two gas jars each contain a different gas. The gas jars are connected and the cover slips are removed.

The diagram shows what happens to the particles of the gases.



Which process has occurred?

- A** chemical reaction
- B** condensation
- C** diffusion
- D** evaporation

51. 0620_w14_qp_11 Q: 1

Which statement is an example of diffusion?

- A** A kitchen towel soaks up some spilt milk.
- B** Ice cream melts in a warm room.
- C** Pollen from flowers is blown by the wind.
- D** The smell of cooking spreads through a house.

52. 0620_w14_qp_13 Q: 1

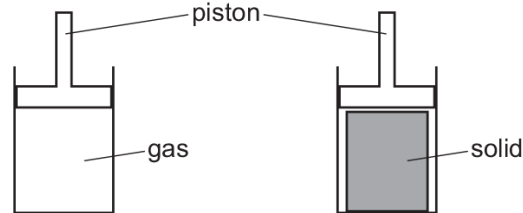
A few drops of perfume were spilt on the floor. A few minutes later the perfume could be smelt a few metres away.

Which two processes had taken place?

- A** distillation and condensation
- B** distillation and diffusion
- C** evaporation and condensation
- D** evaporation and diffusion

53. 0620_w13_qp_11 Q: 1

An attempt was made to compress a gas and a solid using the apparatus shown.



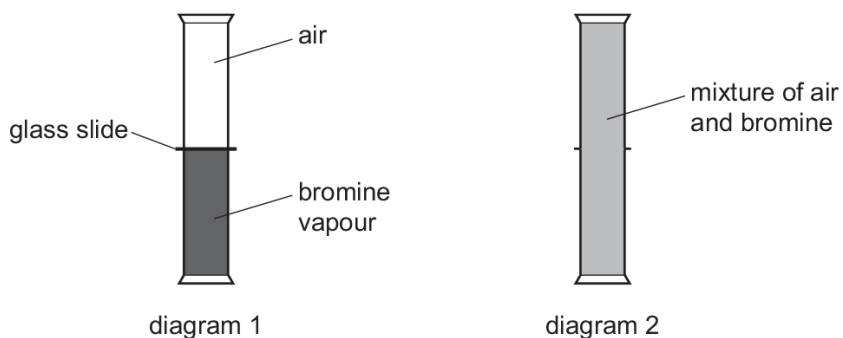
Which substance would be compressed and what is the reason for this?

	substance	reason
A	gas	the gas particles are close together
B	gas	the gas particles are far apart
C	solid	the solid particles are close together
D	solid	the solid particles are far apart

54. 0620_w13_qp_13 Q: 1

A gas jar of bromine vapour and a gas jar of air are set up as shown in diagram 1.

The glass slide is removed. Diagram 2 shows the appearance of the gas jars after one hour.

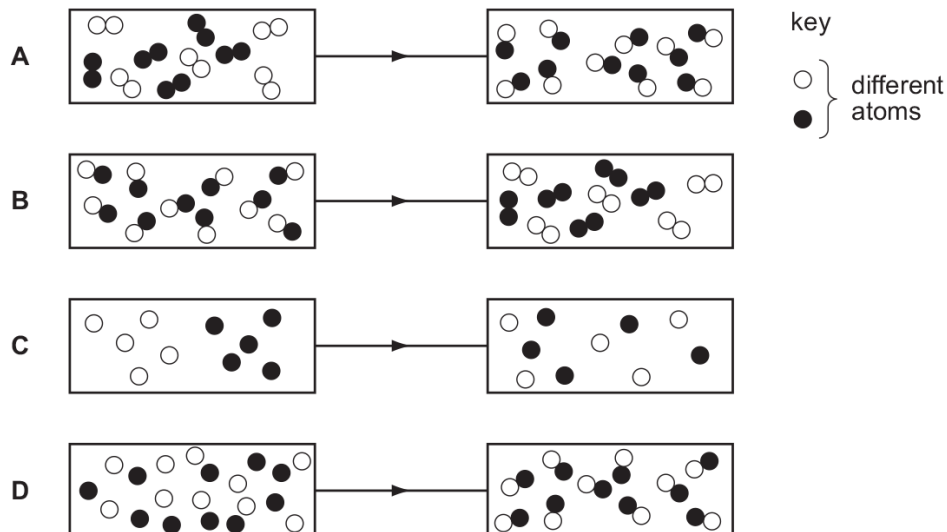


Which statement explains why the bromine and air mix together?

- A Bromine is denser than air.
- B Bromine is lighter than air.
- C Bromine molecules moved upwards and molecules in air moved downwards.
- D Molecules in bromine and air moved randomly.

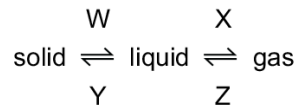
55. 0620_s12_qp_11 Q: 1

Which diagram shows the process of diffusion?



56. 0620_w12_qp_11 Q: 1

What are the processes W, X, Y and Z in the following diagram?



	W	X	Y	Z
A	condensing	boiling	freezing	melting
B	condensing	freezing	melting	boiling
C	melting	boiling	freezing	condensing
D	melting	freezing	condensing	boiling

57. 0620_w12_qp_13 Q: 1

'Particles moving **very slowly** from an area of high concentration to an area of low concentration.'

Which process is being described above?

- A** a liquid being frozen
- B** a solid melting
- C** a substance diffusing through a liquid
- D** a substance diffusing through the air

Chapter 2

Experimental techniques

2.1 Measurement

58. 0620_s21_qp_13 Q: 6

Which piece of apparatus is used to measure exactly 25.00 cm^3 of hydrochloric acid?

- A beaker
 - B measuring cylinder
 - C pipette
 - D balance
-

59. 0620_w21_qp_11 Q: 2

A student put exactly 25.00 cm^3 of dilute hydrochloric acid into a conical flask.

The student added 2.5 g of solid sodium carbonate and measured the change in temperature of the mixture.

Which apparatus does the student need to use?

- A balance, measuring cylinder, thermometer
 - B balance, pipette, stopwatch
 - C balance, pipette, thermometer
 - D burette, pipette, thermometer
-

Appendix A

Answers

SN	Paper	Q. No.	Answer
1	0620_m21_qp_12	1	D
2	0620_s21_qp_11	1	B
3	0620_s21_qp_13	1	B
4	0620_s21_qp_13	2	D
5	0620_w21_qp_11	1	B
6	0620_w21_qp_12	1	C
7	0620_w21_qp_13	1	A
8	0620_m20_qp_12	1	A
9	0620_p20_qp_10	1	D
10	0620_s20_qp_11	1	A
11	0620_s20_qp_12	1	D
12	0620_s20_qp_13	1	C
13	0620_w20_qp_11	1	C
14	0620_w20_qp_11	2	D
15	0620_w20_qp_12	1	C
16	0620_m19_qp_12	1	C
17	0620_s19_qp_11	1	D
18	0620_s19_qp_12	1	D
19	0620_s19_qp_13	1	A
20	0620_w19_qp_11	1	A
21	0620_m18_qp_12	1	C
22	0620_s18_qp_11	1	B
23	0620_s18_qp_12	1	D
24	0620_w18_qp_11	1	D
25	0620_w18_qp_11	2	C
26	0620_w18_qp_12	1	B
27	0620_w18_qp_12	2	D
28	0620_w18_qp_13	1	B
29	0620_w18_qp_13	2	C
30	0620_m17_qp_12	1	B
31	0620_s17_qp_11	1	B
32	0620_s17_qp_12	1	B
33	0620_s17_qp_13	1	B
34	0620_w17_qp_11	1	D
35	0620_w17_qp_12	1	D
36	0620_w17_qp_13	1	B
37	0620_m16_qp_12	1	B
38	0620_p16_qp_10	1	D
39	0620_p16_qp_10	2	C
40	0620_s16_qp_11	1	D
41	0620_w16_qp_11	1	C
42	0620_m15_qp_12	1	C
43	0620_s15_qp_11	1	B
44	0620_s15_qp_12	1	B
45	0620_s15_qp_13	1	C
46	0620_w15_qp_11	1	B
47	0620_w15_qp_12	1	B
48	0620_w15_qp_13	1	A
49	0620_s14_qp_11	1	D

SN	Paper	Q. No.	Answer
50	0620_s14_qp_12	1	C
51	0620_w14_qp_11	1	D
52	0620_w14_qp_13	1	D
53	0620_w13_qp_11	1	B
54	0620_w13_qp_13	1	D
55	0620_s12_qp_11	1	C
56	0620_w12_qp_11	1	C
57	0620_w12_qp_13	1	C
58	0620_s21_qp_13	6	C
59	0620_w21_qp_11	2	C
60	0620_w21_qp_12	2	C
61	0620_w21_qp_13	2	C
62	0620_m20_qp_12	3	D
63	0620_s20_qp_11	2	C
64	0620_s20_qp_12	2	D
65	0620_s20_qp_13	2	B
66	0620_w20_qp_11	3	D
67	0620_w20_qp_12	2	B
68	0620_w20_qp_13	2	D
69	0620_m19_qp_12	2	A
70	0620_m19_qp_12	4	C
71	0620_s19_qp_11	2	A
72	0620_s19_qp_12	2	C
73	0620_s19_qp_13	2	C
74	0620_w19_qp_11	2	A
75	0620_m18_qp_12	2	B
76	0620_s18_qp_11	2	A
77	0620_s18_qp_12	2	D
78	0620_s18_qp_13	2	A
79	0620_w18_qp_11	4	A
80	0620_m17_qp_12	3	B
81	0620_s17_qp_11	2	B
82	0620_s17_qp_12	2	B
83	0620_s17_qp_13	2	D
84	0620_w17_qp_11	3	C
85	0620_w17_qp_12	3	B
86	0620_w17_qp_13	3	C
87	0620_m16_qp_12	2	C
88	0620_s16_qp_11	3	C
89	0620_w16_qp_11	2	B
90	0620_m15_qp_12	2	D
91	0620_s15_qp_11	2	C
92	0620_w15_qp_11	2	A
93	0620_w15_qp_12	2	A
94	0620_w15_qp_13	2	B
95	0620_s14_qp_11	2	A
96	0620_w14_qp_11	2	A
97	0620_w14_qp_13	2	C
98	0620_s13_qp_11	2	C