

1 The three states of matter are solid, liquid and gas.

(a) Complete Table 1.1 to describe the structures of solids, liquids and gases in terms of particle separation, particle arrangement and particle motion.

Table 1.1

state of matter	particle separation	particle arrangement	particle motion
solid	touching		
liquid			
gas		random	random

[3]

(b) Substances can physically change.

Name each physical change:

- solid to liquid
- gas to liquid
- solid to aqueous.

[3]

(c) Gases diffuse.

(i) Describe, in terms of particles, why gases diffuse.

..... [1]

(ii) State what determines the relative rate of diffusion of gases at constant temperature.

..... [1]



Question	Answer				Marks
1(a)		particle separation	particle arrangement	particle motion	3
	solid		uniform	vibrate	
	liquid	touching	random	random	
	gas	apart			
1(b)	M1 melting M2 condensing / condensation M3 dissolving				3
1(c)(i)	motion / movement of particles				1
1(c)(ii)	relative molecular mass				1

- 2 Table 2.1 shows the melting points, boiling points and electrical conductivities of seven substances, **A**, **B**, **C**, **D**, **E**, **F** and **G**.

Table 2.1

substance	melting point /°C	boiling point /°C	electrical conductivity when solid	electrical conductivity when molten
A	1600	2230	poor	poor
B	−219	−183	poor	poor
C	770	1420	poor	good
D	−39	357	good	good
E	−7	58	poor	poor
F	44	280	poor	poor
G	1085	2562	good	good

- (a) Identify which substance, **A**, **B**, **C**, **D**, **E**, **F** or **G**, is:

- (i) a gas at 25 °C

..... [1]

- (ii) a solid consisting of simple molecules at 25 °C

..... [1]

- (iii) a metal which is liquid at 25 °C.

..... [1]



2(a)(i)	B	1
2(a)(ii)	F	1
2(a)(iii)	D	1

- 1 This question is about gases found in clean, dry air and gases found in polluted air.

(e) All gases diffuse.

- (i) Choose from the list of formulae the gas which diffuses most quickly.

Draw a circle around your answer.

CO CO₂ CH₄ NO₂ SO₂

[1]

- (ii) Explain your answer to (i).

..... [1]

Question	Answer	Marks
1(e)(i)	CH ₄	1
1(e)(ii)	lowest relative molecular mass	1

- 1 The names of the elements of Period 2 of the Periodic Table are shown.

lithium beryllium boron carbon nitrogen oxygen fluorine neon

Answer the following questions about these elements.

Each element may be used once, more than once or not at all.

Identify the element which:

- (e) has the highest rate of diffusion at room temperature

..... [1]

Question	Answer	Marks
----------	--------	-------

1(e)	neon	1
------	------	----------

- 2 The table shows the melting points, boiling points and electrical conductivities of six substances, **D**, **E**, **F**, **G**, **H** and **I**.

substance	melting point /°C	boiling point /°C	conducts electricity when solid	conducts electricity when liquid
D	1083	2567	yes	yes
E	−117	79	no	no
F	3550	4827	no	no
G	119	445	no	no
H	−210	−196	no	no
I	801	1413	no	yes

(a) Identify the substance, **D**, **E**, **F**, **G**, **H** or **I**, which is:

- (i) a liquid at 25°C [1]
- (ii) a gas at 25°C [1]
- (iii) a solid consisting of simple molecules at 25°C. [1]

Question	Answer	Marks
2(a)(i)	E	1
2(a)(ii)	H	1
2(a)(iii)	G	1

- 1 This question is about the first 30 elements in the Periodic Table.

Name the element which:

(e) is the gas with the slowest rate of diffusion at room temperature

..... [1]

Question	Answer	Marks
----------	--------	-------

1(e)	chlorine	1
------	----------	---

1 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]

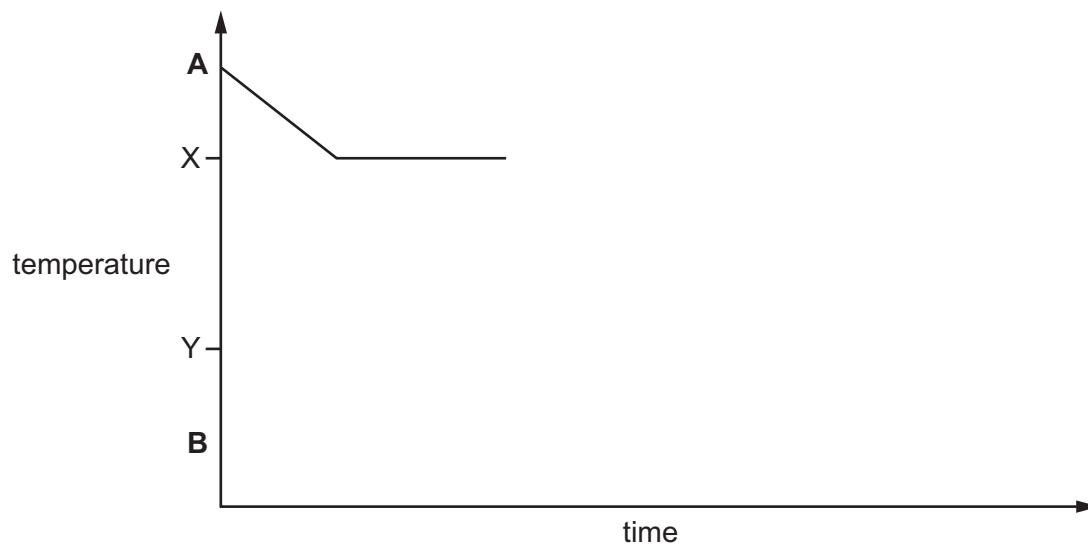
(ii) Name the change of state when:

• 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]

- (d) A solution is a mixture of a solute and a solvent.

- (i) Name the process when a solid substance mixes with a solvent to form a solution.

..... [1]

- (ii) Name the type of reaction when two solutions react to form an insoluble substance.

..... [1]

[Total: 11]

Question	Answer				Marks
1(a)	1 mark for each correct row				3
	State	touching	random movement	regularly arranged	
	Gas		✓		
	Liquid	✓	✓		
	Solid	✓		✓	
1(b)(i)	boiling happens at a specific temperature (1) boiling has bubbles (1)				2
1(b)(ii)	condensation (1) sublimation (1)				2
1(c)	one horizontal line level with Y (1) two separate decreases before and after horizontal line (1)				2
1(d)(i)	dissolving				1
1(d)(ii)	precipitation				1