

CHEMISTRY

PAPER 1C

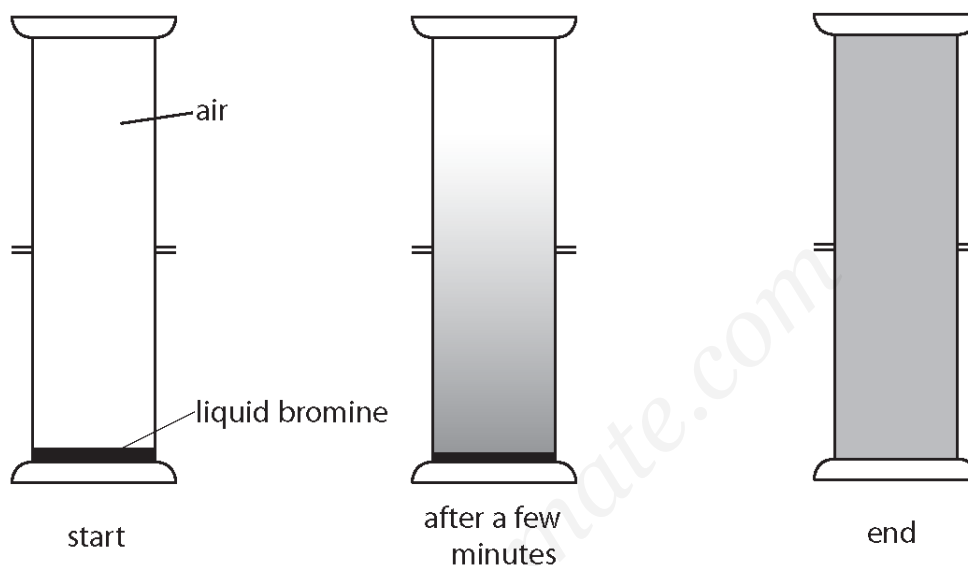
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1- (4CH0-S 2015-Paper 1C-Q2)-KINETIC THEORY AND DIFFUSION

A teacher demonstrates, in a fume cupboard, two experiments to show the movement of particles.

- (a) In the first experiment she places some liquid bromine at the bottom of a gas jar. She then places another gas jar containing air on top of it, as shown in the diagram.

The diagram shows the apparatus at the start, after a few minutes and at the end of the experiment.



Place crosses (☒) in **two** boxes to show which statements are correct about this experiment.

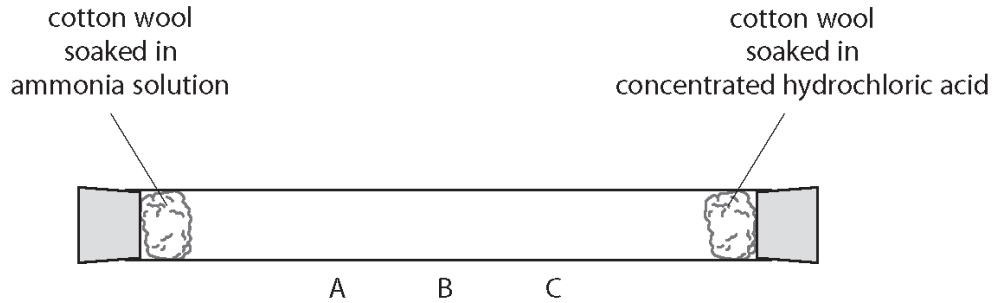
(2)

- A** All the air particles in the upper gas jar stay there.
- B** Bromine and air react to form bromine oxide.
- C** Bromine has a darker colour than air.
- D** Bromine vapour diffuses upwards.
- E** Liquid bromine sublimates during the experiment.
- F** The concentration of bromine in the lower gas jar does not change.

1- (4CH0-S 2015-Paper 1C-Q2)-KINETIC THEORY AND DIFFUSION

- (b) In the second experiment, she soaks two pieces of cotton wool in different liquids and places them at opposite ends of a glass tube. She immediately seals the tube with bungs.

The diagram shows the apparatus at the start of the experiment.



During the experiment a white ring appears in the tube.

- (i) State whether the white ring appears at A, B or C.

(1)

- (ii) Explain your choice.

(2)

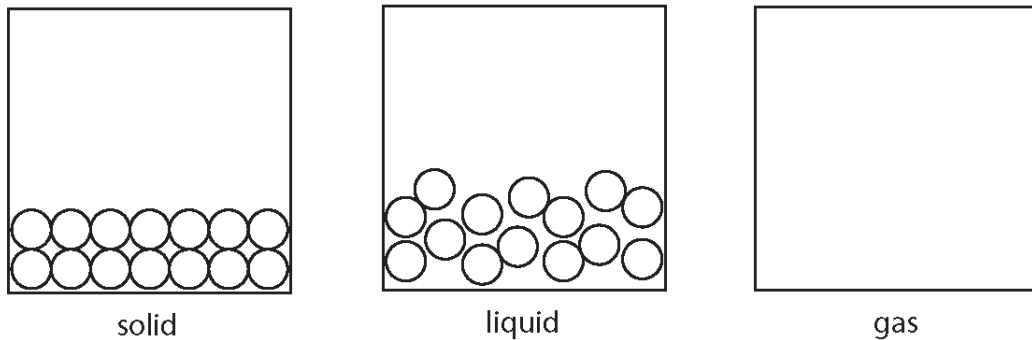
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2- (4CH0-S 2015-Paper 1C-Q1)-KINETIC THEORY AND DIFFUSION

This question is about the states of matter.

(a) The diagram shows the three states of matter for a substance.



Each circle represents a molecule of the substance.

(i) Complete the diagram by drawing six circles to represent molecules in the gas state. (1)

(ii) Which statement is correct about the movement or arrangement of the molecules of this substance? (1)

- A They move randomly in the solid state.
- B They move randomly in the liquid state.
- C They are arranged in fixed positions in the liquid state.
- D They are arranged in fixed positions in the gas state.

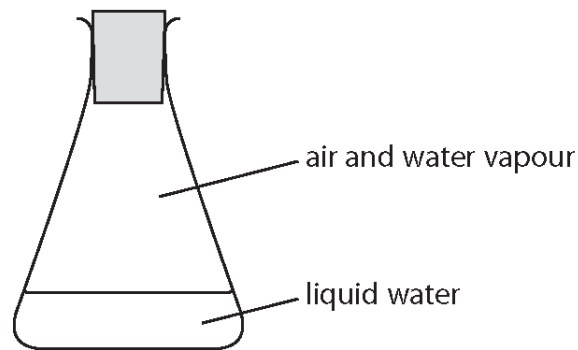
(iii) Which term is used for a solid changing to a liquid? (1)

- A boiling
- B condensing
- C freezing
- D melting

2- (4CH0-S 2015-Paper 1C-Q1)-KINETIC THEORY AND DIFFUSION

(b) Some cold water is poured into a conical flask and a bung inserted.

The diagram shows the flask after a few minutes.



(i) What is occurring in the flask?

(1)

- A boiling and condensing
- B condensing and evaporating
- C evaporating and freezing
- D freezing and melting

(ii) Which formula represents a substance that is **not** present in the flask?

(1)

- A $\text{H}_2\text{O}(\text{g})$
- B $\text{H}_2\text{O}(\text{l})$
- C $\text{N}_2(\text{g})$
- D $\text{N}_2(\text{l})$

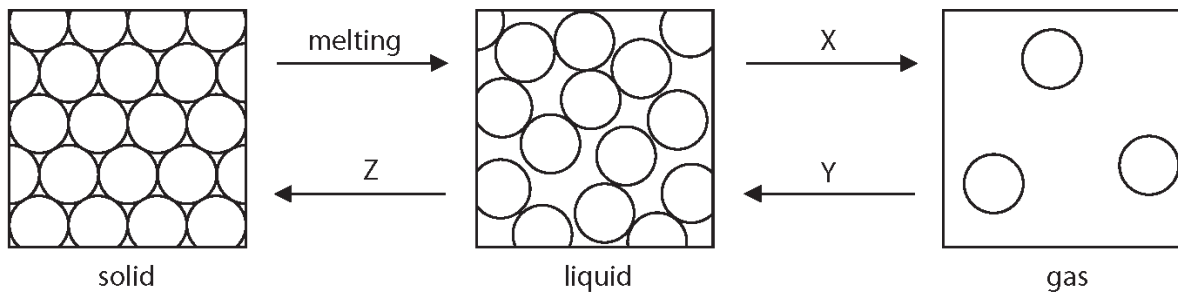
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3- (4CH0-W 2014-Paper 1C-Q2)-KINETIC THEORY AND DIFFUSION

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

The diagram shows how the particles are arranged in each of these states.



(a) Use words from the box to show the changes of state labelled X, Y and Z.

You may use each word once, more than once or not at all.

(3)

boiling condensing crystallisation diffusion freezing

X.....

Y.....

Z.....

(b) Which statement best describes the movement of the particles in a gas?

(1)

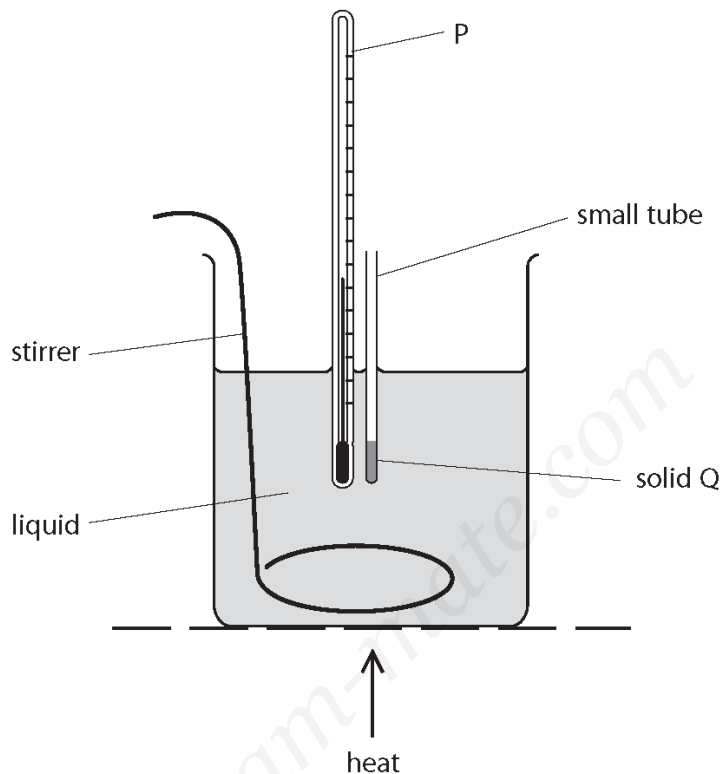
- A** The particles vibrate about fixed positions.
- B** The particles slide past one another.
- C** The particles move freely.
- D** The particles do not move at all.

3- (4CH0-W 2014-Paper 1C-Q2)-KINETIC THEORY AND DIFFUSION

(c) The diagram shows apparatus that can be used to measure the melting point of a solid.

The solid is placed in a small tube. The small tube is then put into a liquid contained in a beaker.

The liquid is gently heated and the temperature at which solid Q melts is recorded.



(i) Give the name of the apparatus labelled P. (1)

(ii) Solid Q melts at 140°C.
Explain why water is not a suitable liquid to use in this experiment. (1)

(iii) Suggest why the liquid in the beaker needs to be stirred constantly. (1)

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4- (4CH0-W 2012-Paper 1C-Q3)-KINETIC THEORY AND DIFFUSION, SEPARATING AND ANALYSING, INTRODUCING REVERSIBLE REACTIONS

Ammonium chloride contains oppositely charged ions.

(a) State the formula of each ion.

(2)

Positive ion

Negative ion

(b) (i) Describe a chemical test to show that a substance contains ammonium ions.

(3)

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(ii) Describe a chemical test to show that a substance contains chloride ions.

(3)

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(c) Ammonium chloride decomposes when heated:



What does the \rightleftharpoons symbol indicate about the reaction?

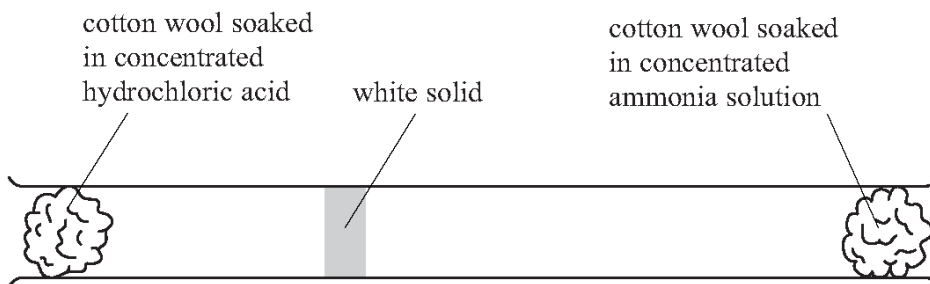
(1)

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4- (4CH0-W 2012-Paper 1C-Q3)-KINETIC THEORY AND DIFFUSION, SEPARATING AND ANALYSING, INTRODUCING REVERSIBLE REACTIONS

(d) The reaction between ammonia and hydrogen chloride can be used to illustrate diffusion with the following apparatus.



After a few minutes, a white solid appears inside the tube.

(i) Identify the white solid. (1)

(ii) What does the diagram show about the speed of the ammonia molecules compared to the speed of the hydrogen chloride molecules? (1)

(e) State the main hazard when using concentrated hydrochloric acid in the experiment in (d).
Suggest **one** precaution you could use to minimise this hazard. (2)

Hazard

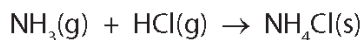
Precaution

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5- (4CH0-S 2012-Paper 1C-Q8)-KINETIC THEORY AND DIFFUSION

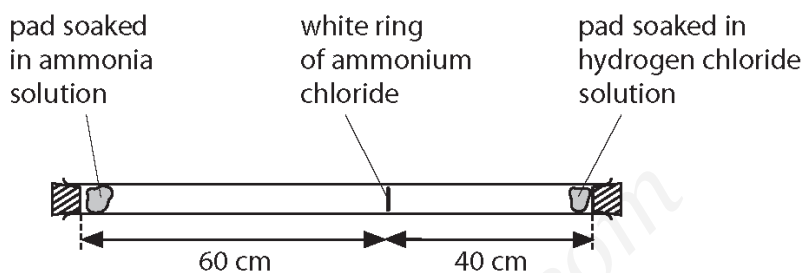
When ammonia gas and hydrogen chloride gas mix, they react together to form a white solid called ammonium chloride.

The equation for the reaction is:



A cotton wool pad was soaked in ammonia solution and another was soaked in hydrogen chloride solution. The two pads were then put into opposite ends of a dry glass tube at the same time.

After five minutes, a white ring of solid ammonium chloride formed.



(a) (i) What name is given to the movement of the two gases? (1)

.....

(ii) Identify which gas is moving faster and give a reason for your choice. (1)

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(b) The experiment was repeated at a higher temperature.

State and explain how this change would affect the time taken for the white ring to form.

(3)

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5- (4CH0-S 2012-Paper 1C-Q8)-KINETIC THEORY AND DIFFUSION

- (c) Gas particles move at a speed of several hundred metres per second at room temperature.

Suggest **one** reason why it took five minutes for the white ring to form.

(1)

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