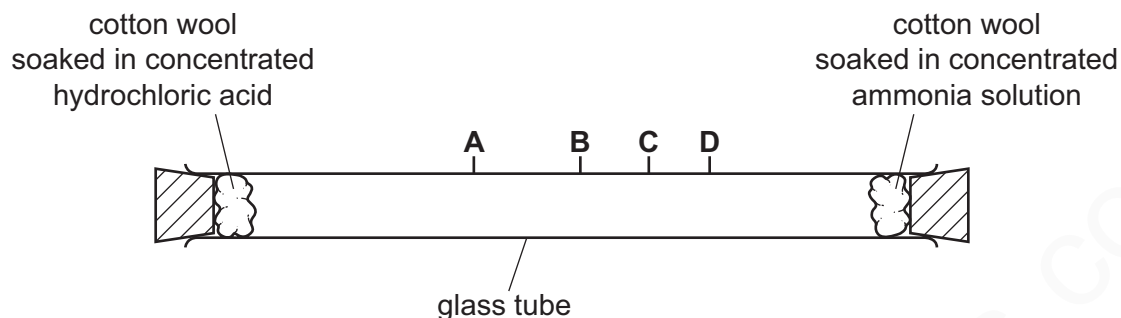


# DIFFUSION

**1** Concentrated ammonia solution gives off ammonia gas. Concentrated hydrochloric acid gives off hydrogen chloride gas. Ammonia,  $\text{NH}_3$ , and hydrogen chloride,  $\text{HCl}$ , are both colourless gases. Ammonia reacts with hydrogen chloride to make the white solid ammonium chloride.

Apparatus is set up as shown.



After ten minutes a white solid forms in the tube where the gases meet.

**(a) (i)** Write the chemical equation for the reaction of ammonia with hydrogen chloride.

..... [1]

**(ii)** Name the process by which the ammonia and hydrogen chloride gases move in the tube.

..... [1]

**(iii)** At which point, **A**, **B**, **C** or **D**, does the white solid form? Explain why the white solid forms at that point.

the solid forms at .....

explanation .....

..... [3]

**(iv)** The experiment was repeated at a higher temperature.

Predict how the results of the experiment would be different. Explain your answer.

.....

.....

..... [3]

**MARKING SCHEME:**

(a)(i)	$\text{NH}_3 + \text{HCl} \rightarrow \text{NH}_4\text{Cl}$ ;	<b>1</b>
(a)(ii)	diffusion;	<b>1</b>
(a)(iii)	solid forms at: A; explanation: ammonia molecules/particles have a smaller mass; (and so) move/diffuse faster;	1 2 <b>3</b>
(a)(iv)	<b>M1</b> solid forms in less time/faster/quicker; <b>M2</b> particles/molecules have more energy; <b>M3</b> (and so) move faster/diffuse faster;	1 1 1 <b>3</b>

2

(a) Carbon and silicon are elements in Group IV of the Periodic Table.  
Carbon dioxide from the air moves into green plants and is converted into carbohydrates.

(i) Name the process by which carbon dioxide molecules move through the air into green plants.

..... [1]

(ii) Explain why silicon(IV) oxide **cannot** move through the air in the same way that carbon dioxide can.

..... [1]

www.smartexamresources.com

**MARKING SCHEME:**

(a)(i)	diffusion	1
(a)(ii)	silicon(IV) oxide is a solid, whereas carbon dioxide is a gas	1

www.smartexamresources.com