



7.2.5 Diffusion

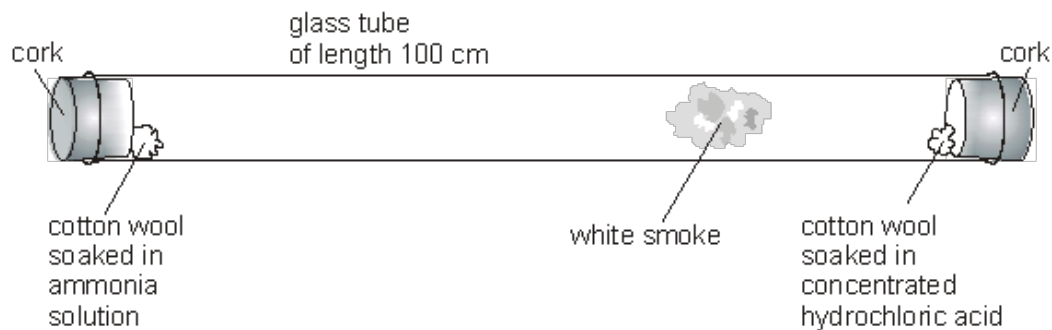


23 minutes



26 marks

- Q1.** An experiment was set up as shown in the drawing. After several minutes white smoke of ammonium chloride, NH_4Cl , appeared as shown.



solution	gas given off	relative molecular mass
ammonia	ammonia	17
hydrochloric acid	hydrogen chloride	36.5

- (a) Write a balanced equation for the reaction which produced the white smoke.

.....

1 mark

- (b) (i) Explain why the smoke formed after several minutes, rather than immediately.

.....

.....

1 mark

- (ii) Explain why the smoke formed nearer to the hydrochloric acid end of the tube than to the ammonia end.

.....

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.....

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2 marks

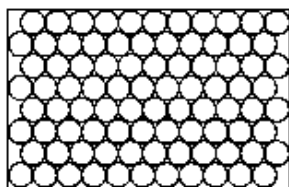
- (c) The formula of the gas ethylamine is $\text{C}_2\text{H}_5\text{NH}_2$. Its relative molecular mass is 45. If the experiment were repeated using ethylamine solution instead of ammonia solution, white smoke of ethylamine hydrochloride, $\text{C}_2\text{H}_5\text{NH}_3\text{Cl}$, would form.

Draw a cross (X) on the drawing to show where the smoke would form and explain your answer.

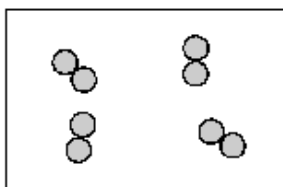
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2 marks
 Maximum 6 marks

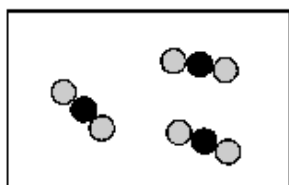
- Q2.** The diagrams represent the arrangement of atoms or molecules in four different substances, A, B, C and D.



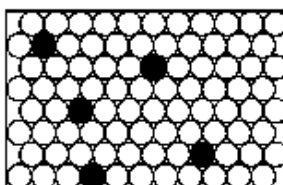
A



B



C



D

not to scale

Each of the circles, , and represents an atom of a different element.

- (a) (i) Which substance is a compound?

.....

1 mark

- (ii) Which substance is a mixture?

.....

1 mark

- (iii) Which **two** substances are elements?

..... and

1 mark

(iv) Which **two** substances could be good thermal conductors?

..... and

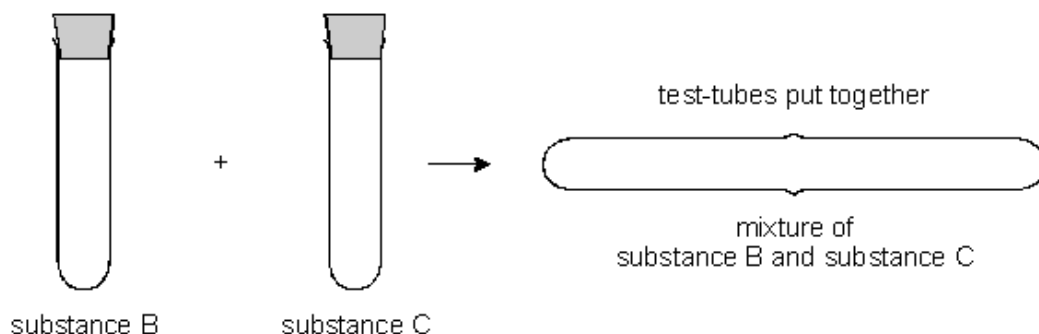
1 mark

(v) Which substance could be carbon dioxide?

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1 mark

- (b) The following experiment was set up. Test-tubes containing substances B and C were placed together as shown. The substances did **not** react. They were left for five minutes.

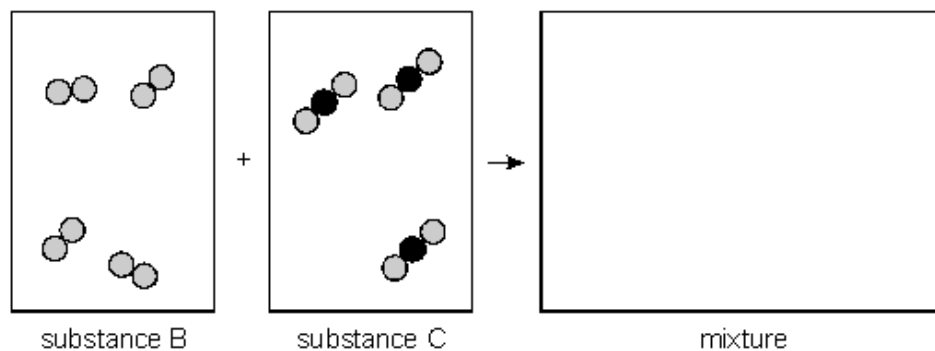


- (i) How many molecules are there in the mixture compared to the total number in substances B and C?

.....

1 mark

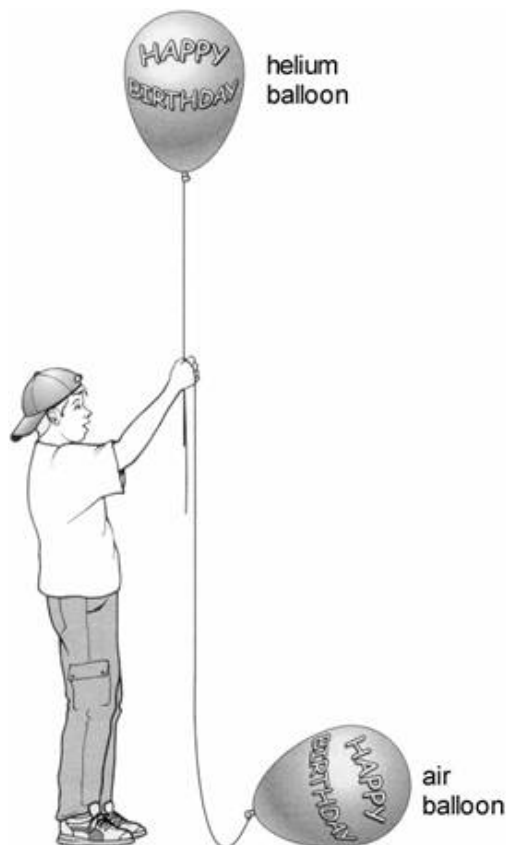
- (ii) Complete the diagram which is a model of this experiment.



1 mark

Maximum 7 marks

- Q3.** Chris has two rubber party balloons. One is filled with air and the other is filled with helium. Both balloons contain the same volume of gas.



- (a) (i) Explain why the helium balloon rises.

.....
.....

1 mark

- (ii) Explain why the air balloon drops to the ground.

.....
.....

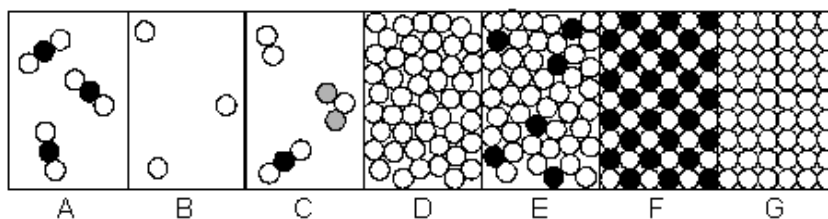
1 mark

- (b) The chemical symbol for helium is He.
Explain why air does **not** have a chemical symbol or formula.

.....
.....

1 mark

- (c) The diagram below shows seven arrangements of particles.



The two party balloons are coated with a thin layer of aluminium.
Give the letter of the diagram which best represents the particles in:

- (i) the helium gas; 1 mark
- (ii) the air; 1 mark
- (iii) the thin layer of aluminium. 1 mark
- (d) Over several days, the balloons shrink because the particles of gas diffuse through the balloon and escape. The helium balloon shrinks more quickly than the air-filled balloon. Answer the following questions in terms of particles.
- (i) Why does helium escape more quickly than air from a balloon?
.....
..... 1 mark
- (ii) A rubber balloon coated with aluminium takes longer to shrink than a rubber balloon **without** an aluminium coating.
Suggest a reason why gas particles diffuse more slowly through aluminium than through rubber.
.....
..... 1 mark

Maximum 8 marks

Q4. As apples become ripe they produce a gas called ethene.
Ethene passes through the air from ripe apples to unripe apples.
Ethene causes unripe apples to ripen more quickly.

(a) Three effects of ethene on apples are listed below.

- The green substance, chlorophyll, breaks down.
- Starch breaks down to form glucose.
- Pectin, a substance which holds cells together, breaks down.

Describe and explain the changes you would notice when apples become ripe as a result of any **two** of these effects.

1. change

.....

explanation

.....

1 mark

2. change

.....

explanation

.....

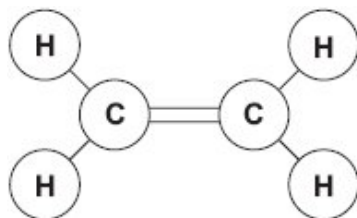
1 mark

(b) Give the name of the process by which gases such as ethene spread through the air in a room.

.....

1 mark

(c) The diagram below represents a molecule of ethene.



Ethene is flammable and must be kept away from naked flames.
Look at the diagram of the molecule of ethene.

Give the name and chemical formula of the **two** compounds formed when ethene burns in oxygen.

1. name

.....

formula

.....

1 mark

2. name

.....

formula

.....

1 mark
maximum 5 marks

