

Section A

Answer **all** the questions in the spaces provided.

- 1 (a) Use **three** words from the box below to describe each substance in Table 1.1. The words can be used once, more than once, or not at all.

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solid	liquid	gas	atom	molecule
	element	compound	mixture	ions

Table 1.1

substance	diagram	description words
A		1 2 3
B		1 2 3
C		1 2 3

[3]

- (b) (i) Explain why substance **A** will conduct electricity when dissolved in water.

..... [1]

- (ii) Suggest another way of making substance **A** conduct electricity.

..... [1]

- 2 Spots of different coloured dyes were placed along a pencil line on a sheet of chromatography paper. The paper was then placed in a solvent.

Fig. 2.1 shows the chromatogram obtained.

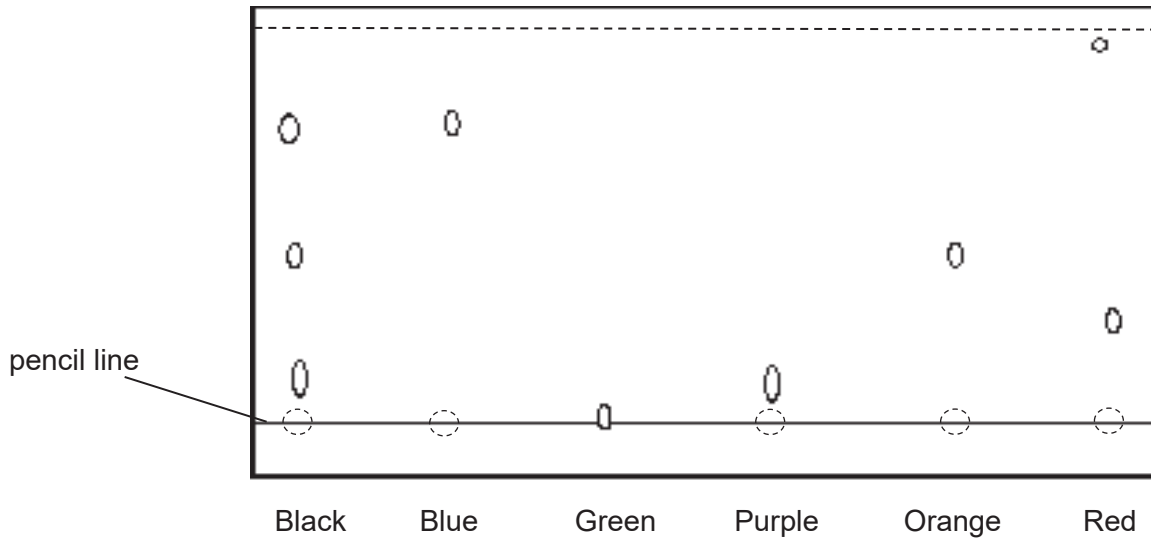


Fig. 2.1

- (a) Which physical property allows chromatography to separate components of the dyes?

..... [1]

- (b) Based on Fig. 2.1, what can be deduced about the components of the black dye?

..... [1]

- (c) Suggest why the start line was drawn in pencil line and **not** in ink for this experiment?

..... [1]
.....

3 Hydrogen bromide has a melting point of $-87\text{ }^{\circ}\text{C}$ and a boiling point of $-67\text{ }^{\circ}\text{C}$.

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(a) Draw a 'dot and cross' diagram to show the arrangement of electrons in a molecule of hydrogen bromide. Show only the outer shell electrons.

[2]

(b) Hydrogen bromide dissolves in water to form an acidic solution which is colourless.

(i) Give the formula of the ion which causes the acidity.

..... [1]

(ii) Describe what is seen when chlorine gas is bubbled through the solution.

.....
..... [1]

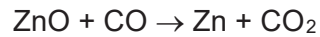
(iii) Construct an ionic equation, including state symbols, for the reaction you have described in **(ii)**.

..... [2]

- 4 Zinc blende is an ore that contains mainly zinc sulfide (ZnS). The extraction of zinc from its ore happens in the blast furnace.

The ore of zinc blende is roasted in air (oxygen) to form zinc oxide which is then reduced with carbon monoxide in the blast furnace, similar to the extraction of iron from haematite.

The extraction of zinc can be represented by the equation as shown.



- (a) State which substance is reduced and give a reason for your answer.

substance reduced

reason

[2]

- (b) Zinc produced by the blast furnace is often alloyed to increase its hardness and strength. Brass is an alloy of zinc and copper.

- (i) Draw the structure of brass in the box provided in Fig. 4.1.



Fig. 4.1

[1]

- (ii) With reference to your drawing in Fig. 4.1, explain why brass is harder and stronger compared to pure zinc.

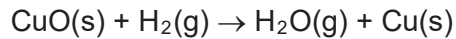
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.....

.....

[2]

- 5 The reaction between copper(II) oxide and hydrogen can be represented by the equation as shown.



In this reaction, 0.40 g of solid copper(II) oxide was used.

- (a) (i) Calculate the number of moles of copper(II) oxide used in the reaction.

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[1]

- (ii) Hence, determine the number of moles of hydrogen gas is required for all the copper(II) oxide to be used up in the reaction.

[1]

- (b) It is also known that 165 cm³ of hydrogen gas was used in the reaction.

- (i) Using your answer from (a), determine the limiting reagent.
Explain your answer clearly by showing all relevant calculations.

[3]

- (ii) Hence or otherwise, calculate the mass of water vapour produced at the end of the reaction.

[2]

- 6 Part of the Periodic Table is shown in Fig. 6.1.
The letters are **not** the actual chemical symbol of the elements.

V									X				
									Y				
W												Z	

Fig. 6.1

For each of the following statements, decide whether the statement is true or false and state a reason for your decision.

- (a) **W** is more metallic than **Z**.

.....
..... [1]

- (b) **V** is less reactive than **W**.

.....
..... [1]

- (c) **V** has a lower melting point than **W**.

.....
..... [1]

- (d) **X** has more electron shells than **Y**.

.....
..... [1]

- 7 Study the flowchart in Fig. 7.1 and answer the following questions.

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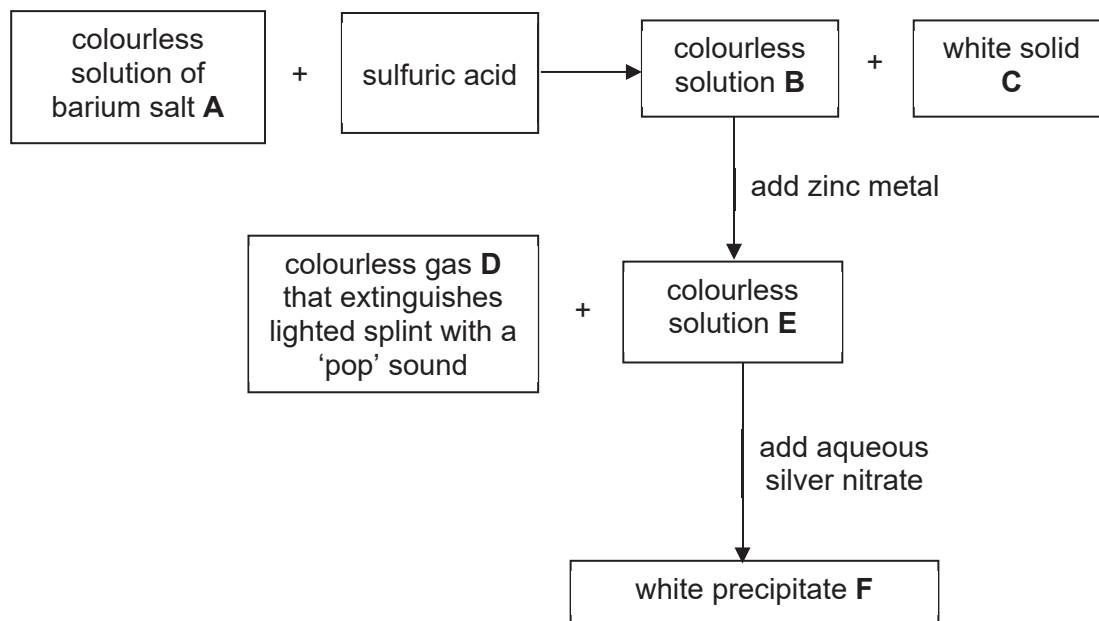


Fig. 7.1

- (a) Identify substances **A** to **F**.

A

B

C

D

E

F

[6]

- (b) Write a balanced chemical equation for any **one** of the reactions described in Fig. 7.1.

.....

[2]

- 8 (a) A chemical company makes salts for use in industries. Table 8.1 shows some names and formulae of salts with the names of the acids and other compounds used to make them.

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Complete the table by writing the missing information.

Table 8.1

name of salt	formula of salt	name of acid used to make salt	name of the other compound used to make salt
sodium sulfate	Na_2SO_4		
potassium phosphate	K_3PO_4	phosphoric acid	
silver chloride	AgCl		
calcium phosphate		phosphoric acid	calcium hydroxide

[3]

- (b) Fig. 8.2 shows a rusted car. However, not all the parts have rusted. The areas that have not rusted are either painted or have plastic coatings.



Fig. 8.2

Explain how the paint and plastic coating can slow down rusting.

.....

.....

[2]

- (c) Harmful gases released into the atmosphere can form acid rain which speeds up rusting. Name **one** such gas which causes acid rain and state its source.

.....

[2]