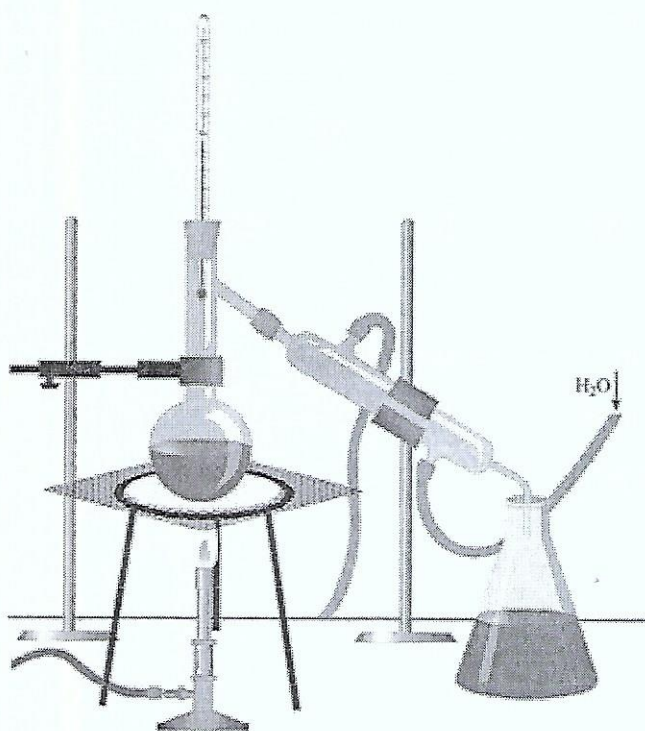


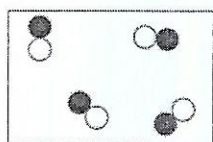
# Practice Questions

## GCSE Chemistry

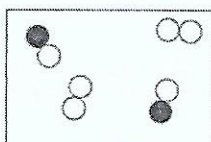
### Booklet 4



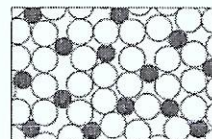
1. (a) The following five diagrams show the arrangement of atoms in different substances.



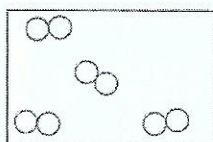
A



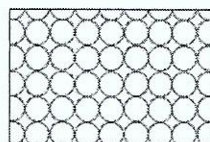
B



C



D



E

Give the letter of the diagram that best represents

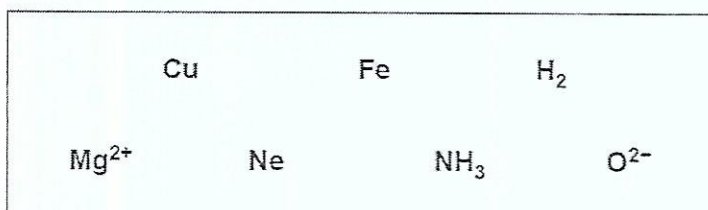
[3]

a compound, .....

a gaseous element, .....

an alloy. ....

(b) Choose the answers to this question from the following symbols and formulae.



Give the symbol or formula for

[2]

a compound, .....

a metal ion. ....

2. (a) The formula for calcium chloride is  $\text{CaCl}_2$ .

Give the **names** of the two elements present in this compound.

[1]

..... and .....

(b) Name a **metal** which is in the same period of the Periodic Table as argon.

[1]

.....

(c) (i) A formula for nitrogen oxide is  $\text{N}_2\text{O}$ .

A molecule of nitrogen oxide can be drawn as follows.



Give the **name** of the element which is represented by .

[1]

.....

(ii) Draw your own key to represent hydrogen and carbon atoms. Use your key to draw a molecule of methane,  $\text{CH}_4$ .

[2]

Key

hydrogen	
carbon	

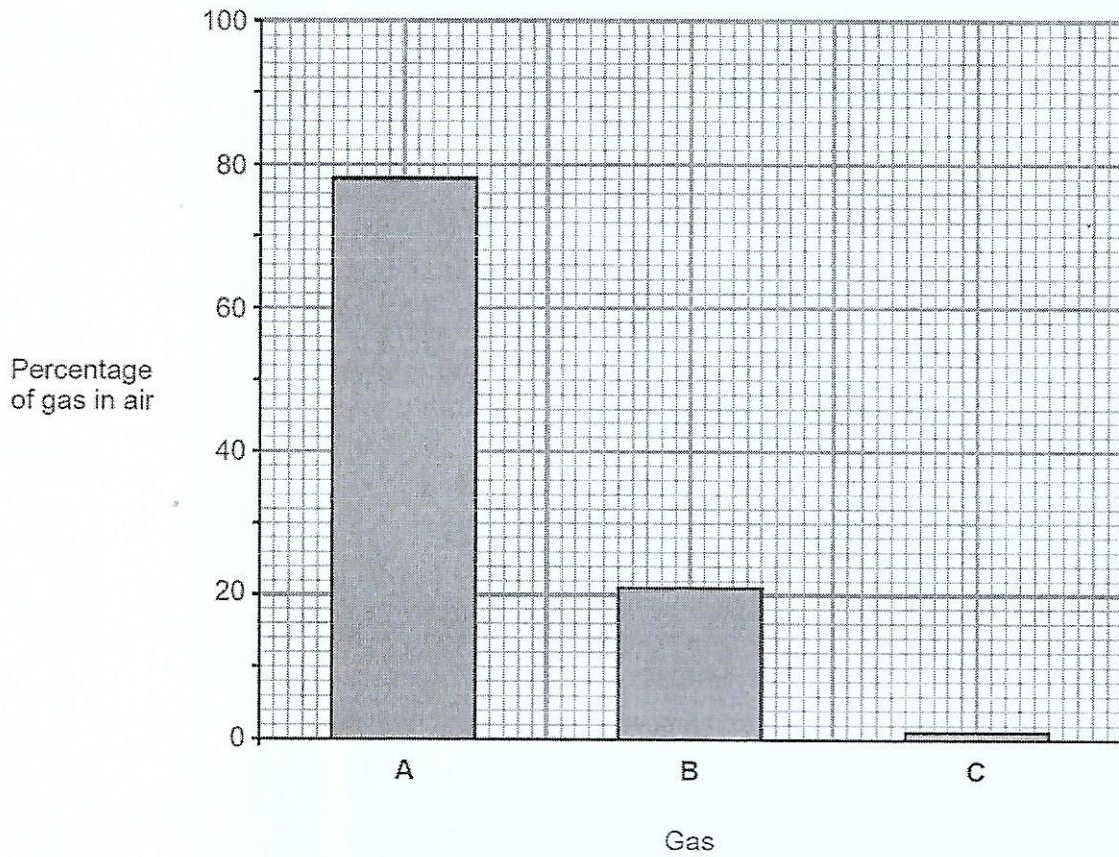
*Methane*

(d) Fizzy drinks such as lemonade contain carbonic acid. Each molecule of carbonic acid contains two atoms of hydrogen, one atom of carbon and three atoms of oxygen.

[1]

Give the formula for carbonic acid. ....

3. (a) The bar chart below shows the percentage of the three main gases in air.



Choose from the box below the names of gases A, B and C.

[3]

argon	chlorine	hydrogen
methane	nitrogen	oxygen

A .....

B .....

C .....

4. The following table contains some information about five elements, A, B, C, D and E.

Element	Melting point (°C)	Boiling point (°C)	Electrical conductivity
A	113	445	poor
B	-39	357	good
C	3550	4828	poor
D	-101	-35	poor
E	1540	2750	good

(a) Give the letter of the element, A-E, that is a liquid at 20 °C. Explain your choice. [3]

.....

.....

.....

(b) State which element could be iron and explain your choice. [3]

.....

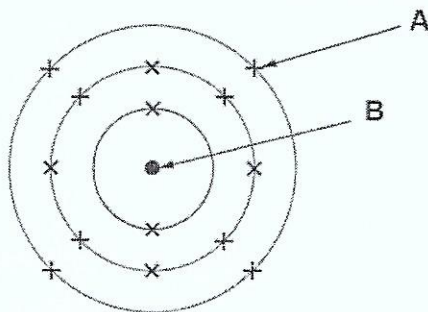
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(c) State one property of iron that is not mentioned in the table. [1]

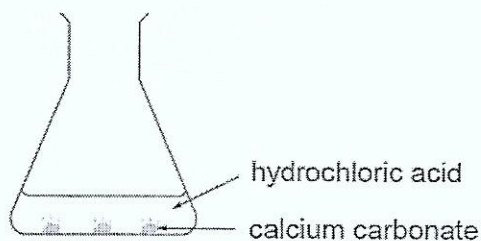
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6. The diagram shows an atom of silicon.



- (a) Name particle A. .... [1]
- (b) B is the nucleus. Name the **two** types of particle present in the nucleus of an atom. [2]  
..... and .....
- (c) Use the information in the diagram to give
- (i) the atomic number of silicon, ..... [1]
- (ii) the electronic structure of silicon. .... [1]

7. An investigation was carried out to find the effect of different factors on the rate of reaction of calcium carbonate and hydrochloric acid.



The time taken for the calcium carbonate to disappear in each experiment is shown in the table below.

Experiment number	Form of calcium carbonate	Temperature of acid (°C)	Time taken for calcium carbonate to disappear (s)
1	marble chips	20	600
2	powder	20	150
3	marble chips	40	400

- (a) (i) Use the results to describe the effect of changing temperature on reaction time. [1]

.....  
.....

- (ii) Name the factor that has changed between experiments 1 and 2 and describe what effect this factor has on reaction time. [2]

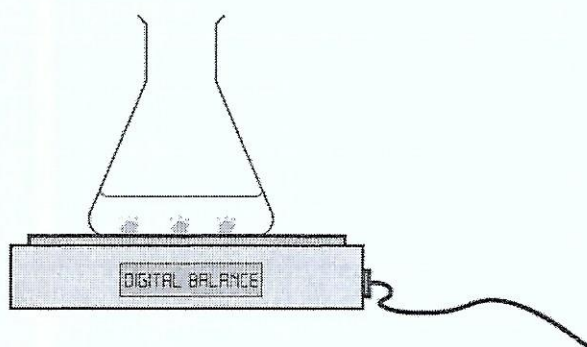
.....  
.....

- (iii) State **two other** factors that should be kept the same in order to make this investigation a fair test. [2]

Factor 1 .....

Factor 2 .....

(b) The rate of reaction can also be investigated by recording the change in mass.



Explain what will happen to the mass during the reaction.

[2]

.....

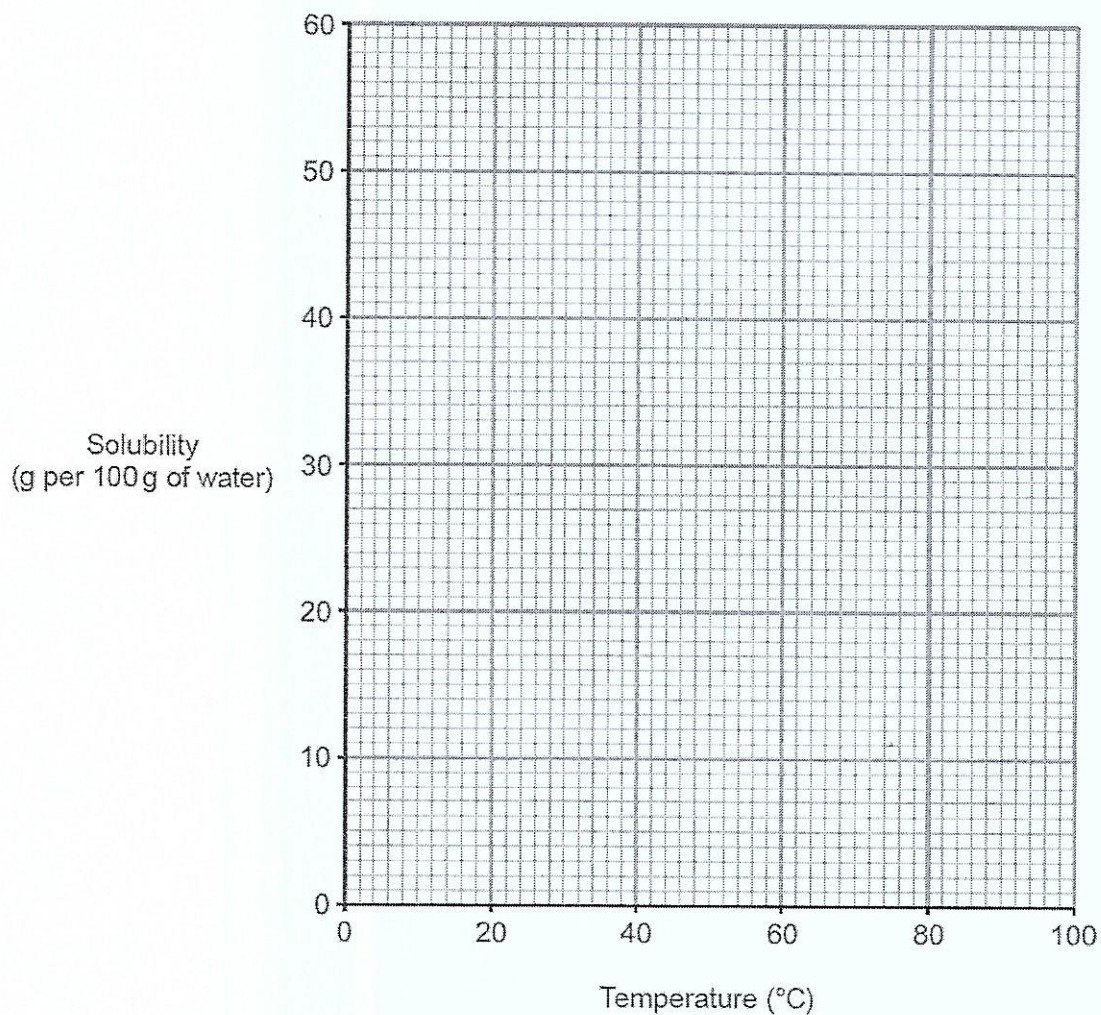
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8. The following table shows the solubility of potassium chlorate at different temperatures.

Temperature (°C)	Solubility (g per 100g of water)
0	3.5
20	7.5
40	14.0
60	24.0
80	37.5
100	56.5

(a) Plot a graph to show the solubility of potassium chlorate on the grid below. Draw a suitable line. [3]



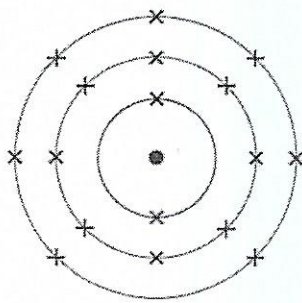
(b) Describe how the solubility of potassium chlorate changes with temperature. [1]

.....  
.....

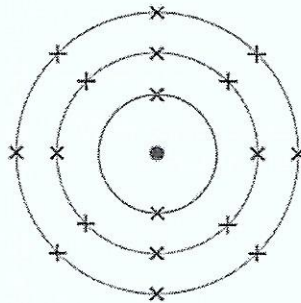
(c) A saturated solution of potassium chlorate at 80 °C is cooled to 20 °C. Describe what you would see and explain why this happens. [2]

.....  
.....  
.....  
.....

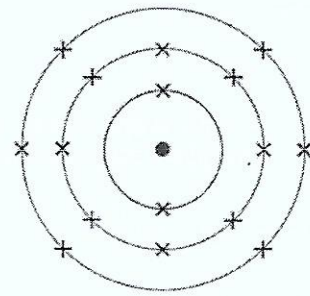
9. The following diagrams show the electronic structures of five elements, A–E.



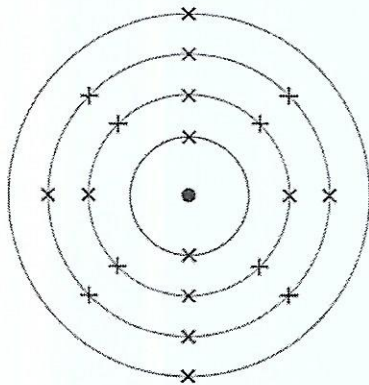
A



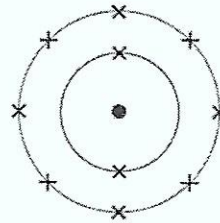
B



C



D



E

- (a) (i) Give the letter of the element, A–E, that is in Period 2 of the Periodic Table. Give the reason for your choice in terms of electronic structure. [2]

Element .....

Reason .....

- (ii) Give the letters, A–E, of two elements that are in Group 0 of the Periodic Table. Give the reason for your choice in terms of electronic structure. [2]

Elements ..... and .....

Reason .....

- (iii) Another element, X, is in the same group as element E but is one place above it. Draw a diagram of the electronic structure of element X. [1]

(b) Explain how the electronic structure of element A can be used to determine the number of protons in its nucleus. [2]

.....

.....

.....

10. (a) Lithium, sodium and potassium are elements in Group 1 of the Periodic Table.

The following table shows what a student recorded when these elements reacted with water. Two of the observations are **incorrect**.

Element	Observations	pH of solution
lithium	bubbles slowly on the surface of the water	6
sodium	bubbles rapidly and melts into a ball	12
potassium	burns with an orange flame	13

Identify the errors and give the correct observations below.

[2]

Error 1 .....

Correction .....

Error 2 .....

Correction .....

- (b) A student carries out tests to prove that a powder contains sodium ions and chloride ions. The following box gives some tests for ions and some expected observations.

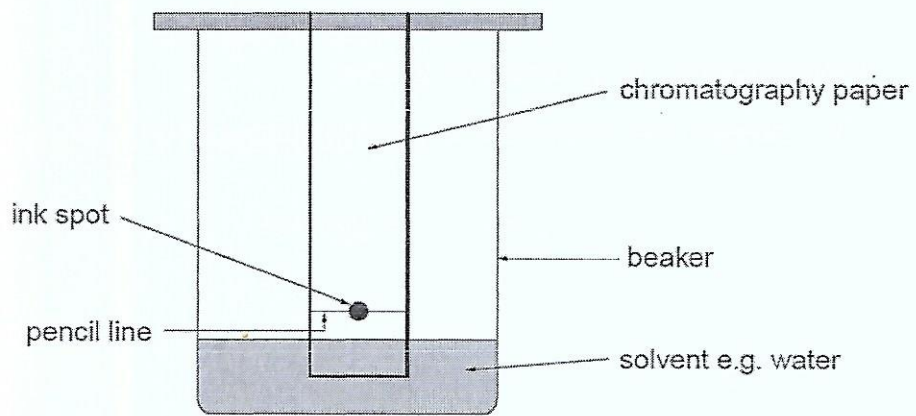
white precipitate	yellow precipitate	no reaction	cream precipitate
flame test	add sodium hydroxide solution	add silver nitrate solution	
add universal indicator	yellow flame	red flame	green flame

Select the appropriate tests and results to complete the following table.

[4]

Ion	Test used	Observation expected
sodium		
chloride		

11. Chromatography can be used to separate the pigments in ink.



Describe how chromatography can be used to determine whether two inks contain the same pigments. [6 QWC]

Your answer should include

- a description of how chromatography is carried out
- a description of what happens during the process
- how the results would show whether the two inks contain identical or different pigments.

You may include a diagram in your answer.

.....

.....

.....

.....

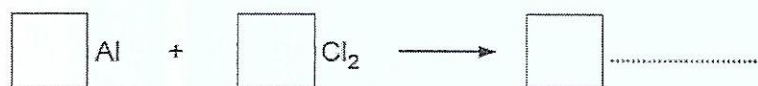
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12. (a) Aluminium reacts with chlorine to form aluminium chloride. Complete and balance the symbol equation for the reaction taking place. [2]



- (b) Aluminium oxide,  $\text{Al}_2\text{O}_3$ , is found in bauxite.

- (i) Calculate the relative formula mass ( $M_r$ ) of aluminium oxide,  $\text{Al}_2\text{O}_3$ . [2]

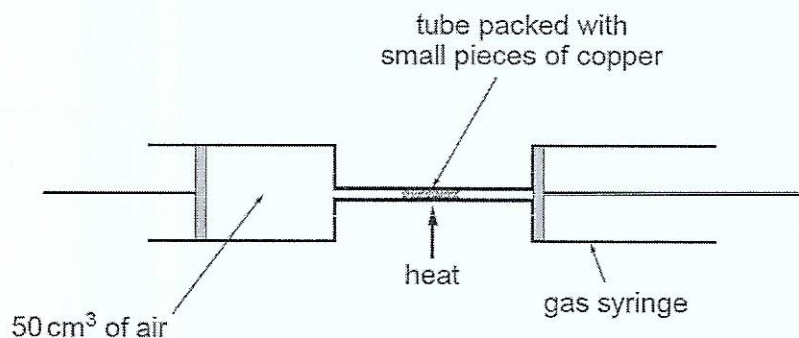
$$A_r(\text{Al}) = 27 \quad A_r(\text{O}) = 16$$

$$M_r(\text{Al}_2\text{O}_3) = \dots\dots\dots$$

- (ii) Using your answer from part (i) calculate the percentage of oxygen present in aluminium oxide,  $\text{Al}_2\text{O}_3$ . [1]

$$\text{Percentage oxygen present} = \dots\dots\dots \%$$

13. (a) The percentage of oxygen in air can be found by using the apparatus shown below.



50 cm<sup>3</sup> of air was trapped in one of the syringes. The air was passed forwards and backwards over the heated copper. The copper reacted with the oxygen in the air producing solid copper(II) oxide. The final volume of gas was recorded when the apparatus had cooled to room temperature.

Results

Volume of air before heating                      50.0 cm<sup>3</sup>

Volume of air after heating and cooling            40.5 cm<sup>3</sup>

(i) Use the results to calculate the percentage of oxygen in air. [2]

Percentage of oxygen in air = ..... %

(ii) Suggest why the value for the percentage of oxygen in air calculated in part (i) is lower than the expected value. [1]

.....

.....

14. (a) Complete the following table.

Positive ion	Negative ion	Formula
$\text{Na}^+$	$\text{Br}^-$	$\text{NaBr}$
$\text{Ba}^{2+}$	$\text{OH}^-$	.....
.....	$\text{SO}_4^{2-}$	$\text{Fe}_2(\text{SO}_4)_3$
$\text{K}^+$	.....	$\text{K}_2\text{HPO}_4$

(b) Explain how a sodium atom and a bromine atom form ions when they react to form sodium bromide.

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.....

.....

Triple Extension Question

15. (a) The table below shows information about three substances. Complete the table. [3]

Common name	Chemical name	Chemical formula
.....	calcium carbonate	$\text{CaCO}_3$
quicklime	calcium oxide	.....
slaked lime	.....	$\text{Ca(OH)}_2$

- (b) A group of pupils investigated the composition of egg shells. They suspected that egg shells contain calcium carbonate. They carried out the following tests.

- (i) Flame test

Choose from the box below the colour you would expect to see if egg shells contain calcium ions. [1]

brick-red	lilac	yellow	green	white
-----------	-------	--------	-------	-------

Colour .....

- (ii) Test for carbonate ions by adding dilute hydrochloric acid

Name the gas formed if egg shells contain carbonate ions. Describe the test you would carry out to identify this gas. Include the result for your test. [2]

Gas .....

Test and result .....

- (iii) The pupils were told that 2.0 g of egg shells contain 1.9 g of calcium carbonate. Calculate the percentage of calcium carbonate in these egg shells. [2]

Percentage = ..... %

- (c) The box below shows some of the concerns a local conservation group have about the opening of a new limestone quarry in their area.

Concerns
Noise pollution from blasting
Unightly quarry pits
Dust pollution from rock blasting
Noise and dust pollution from lorries
Habitat destruction

The quarry owner suggests that planting trees around the quarry will reduce the impact of noise pollution. Suggest **two** other things the quarry owner could do to reduce the impact of the quarry on the local environment. [2]

.....

.....

.....

- (d) Suggest **two** advantages of limestone quarrying. [2]

Advantage 1 .....

Advantage 2 .....