

**AQA - Atomic structure and the periodic table – GCSE Chemistry Paper 1**

1. June/2021/Paper\_1F/No.1

0 1

This question is about elements, compounds and mixtures.

0 1 . 1

Substance **A** contains only one type of atom.Substance **A** does **not** conduct electricity.Which type of substance is **A**?**[1 mark]**Tick (✓) **one** box.

Compound

Metallic element

Mixture

Non-metallic element

0 1 . 2

Substance **B** contains two types of atoms.

The atoms are chemically combined together in fixed proportions.

Which type of substance is **B**?**[1 mark]**Tick (✓) **one** box.

Compound

Metallic element

Mixture

Non-metallic element

0 1 . 3 What is the name of the elements in Group 0 of the periodic table?

[1 mark]

Tick (✓) **one** box.

Alkali metals

Halogens

Noble gases

Transition metals

0 1 . 4 Which statement about the elements in Group 0 is correct?

[1 mark]

Tick (✓) **one** box.

All elements in the group are very reactive.

All elements in the group form negative ions.

The boiling points increase down the group.

The relative atomic masses ( $A_r$ ) decrease down the group.

0 1 . 5 Neon is in Group 0.

What type of particles are in a sample of neon?

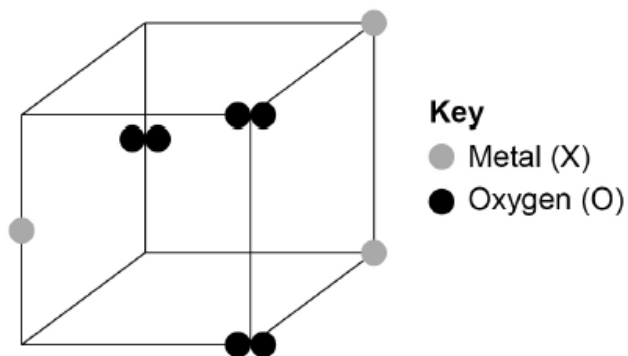
[1 mark]

Tick (✓) **one** box.

Atoms	<input type="checkbox"/>
Ions	<input type="checkbox"/>
Molecules	<input type="checkbox"/>

0 1 . 6 Figure 1 represents part of the structure of an oxide of a metal.

Figure 1



Determine the empirical formula of this oxide.

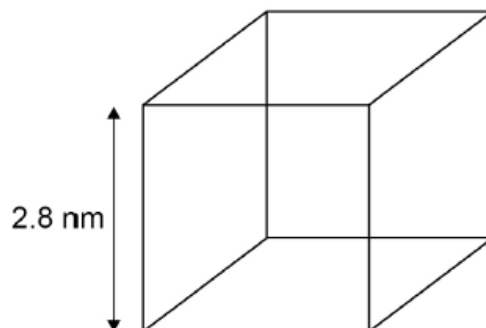
[1 mark]

Empirical formula = XO \_\_\_\_\_

A nanoparticle of a metallic element is a cube.

**Figure 2** shows a diagram of the nanoparticle.

**Figure 2**



0 1 . 7

The surface area of a cube is given by the equation:

$$\text{surface area} = (\text{length of side})^2 \times 6$$

Calculate the surface area of the cube in **Figure 2**.

Give your answer to 2 significant figures.

**[3 marks]**

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Surface area (2 significant figures) = \_\_\_\_\_ nm<sup>2</sup>

0 1 . 8

Fine and coarse particles of the metallic element are also cubes.

The length of a fine particle cube is 10 times smaller than the length of a coarse particle cube.

How does the surface area to volume ratio of the fine particle cube compare with that of the coarse particle cube?

[1 mark]

Tick (✓) **one** box.

Both surface area to volume ratios are the same.

The surface area to volume ratio of the fine particle is 10 times greater.

The surface area to volume ratio of the fine particle is 10 times smaller.

## 2. June/2021/Paper\_1F/No.9

0 9

This question is about atomic structure and the periodic table.

Gallium (Ga) is an element that has two isotopes.

0 9 . 1

Give the meaning of 'isotopes'.

You should answer in terms of subatomic particles.

**[2 marks]**

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0 9 . 2

**Table 8** shows the mass numbers and percentage abundances of the isotopes of gallium.

**Table 8**

Mass number	Percentage abundance (%)
69	60
71	40

Calculate the relative atomic mass ( $A_r$ ) of gallium.

Give your answer to 1 decimal place.

**[2 marks]**

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Relative atomic mass (1 decimal place) = \_\_\_\_\_

Gallium (Ga) is in Group 3 of the modern periodic table.

0 9 . 3 Give the numbers of electrons and neutrons in an atom of the isotope  $^{69}_{31}\text{Ga}$  [2 marks]

Number of electrons \_\_\_\_\_

Number of neutrons \_\_\_\_\_

0 9 . 4 What is the most likely formula of a gallium ion? [1 mark]

Tick (✓) **one** box.

Ga<sup>+</sup>

Ga<sup>-</sup>

Ga<sup>3+</sup>

Ga<sup>3-</sup>

0 9 . 5 Gallium was discovered six years after Mendeleev published his periodic table.

Give **two** reasons why the discovery of gallium helped Mendeleev's periodic table to become accepted.

[2 marks]

1 \_\_\_\_\_

\_\_\_\_\_

2 \_\_\_\_\_

\_\_\_\_\_

## 3. June/2021/Paper\_1H/No.2

0 2

This question is about atomic structure and the periodic table.

Gallium (Ga) is an element that has two isotopes.

0 2 . 1

Give the meaning of 'isotopes'.

You should answer in terms of subatomic particles.

**[2 marks]**

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0 2 . 2

**Table 1** shows the mass numbers and percentage abundances of the isotopes of gallium.

**Table 1**

Mass number	Percentage abundance (%)
69	60
71	40

Calculate the relative atomic mass ( $A_r$ ) of gallium.

Give your answer to 1 decimal place.

**[2 marks]**

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Relative atomic mass (1 decimal place) = \_\_\_\_\_



Gallium (Ga) is in Group 3 of the modern periodic table.

0 2 . 3

Give the numbers of electrons and neutrons in an atom of the isotope  ${}^{69}_{31}\text{Ga}$

[2 marks]

Number of electrons \_\_\_\_\_

Number of neutrons \_\_\_\_\_

0 2 . 4

What is the most likely formula of a gallium ion?

[1 mark]

Tick (✓) **one** box.

Ga<sup>+</sup>

Ga<sup>-</sup>

Ga<sup>3+</sup>

Ga<sup>3-</sup>

0 2 . 5

Gallium was discovered six years after Mendeleev published his periodic table.

Give **two** reasons why the discovery of gallium helped Mendeleev's periodic table to become accepted.

[2 marks]

1 \_\_\_\_\_

\_\_\_\_\_

2 \_\_\_\_\_

\_\_\_\_\_