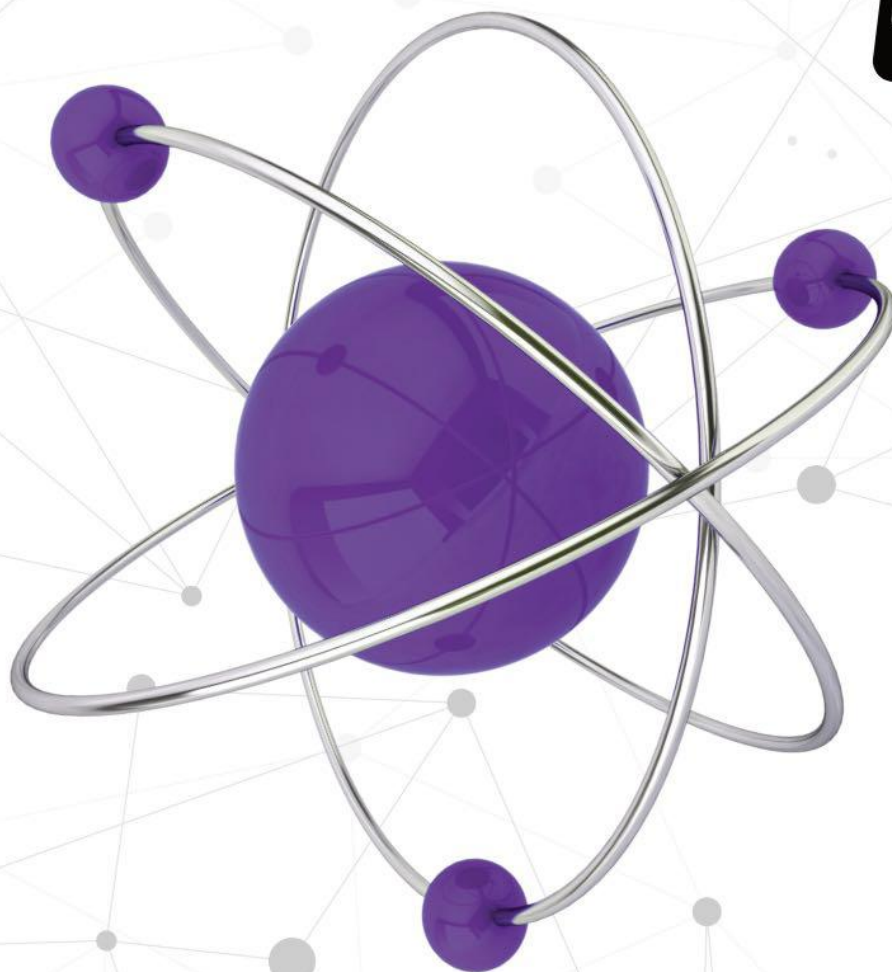


Cambridge IGCSE Chemistry



**2026 - 2028 Syllabus
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Build your answers around the **key terms**



Learn the **Practical details** for Paper 6



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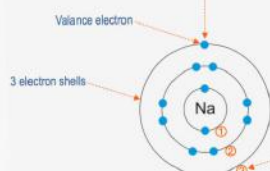


Paper 6 materials

3.3 Electron Configuration Of Atoms

Follow these steps to draw the electron configuration (arrangement) of an atom:

1. Draw the nucleus with the symbol of the element in the centre
2. Draw the number of electron shells according to the period number of the element
3. The number of electrons of the atom = the atomic number
4. Start filling the electrons from the inner shell closest to the nucleus
5. The inner shell can have a maximum of 2 electrons
6. Every other shell can have a maximum of 8 electrons
7. The number of outer shell electrons, also known as valence electrons = the element group number



	Group 1	Group 2
Period 1	1 H hydrogen	
Period 2	3 Li lithium	4 Be beryllium
Period 3	11 Na sodium	12 Mg magnesium



Video Explanation



Key facts in **green**

3.4 Isotopes

Isotopes are atoms of the same element with the same proton number but a different nucleon number

Isotopes are written using their symbol and the mass number (to the upper left) and atomic number (to the lower left); for instance, the sodium (Na) isotope is written as $^{23}_{11}\text{Na}$

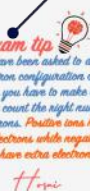
There are two types of isotopes:

- Radioactive (or radioisotopes)** isotopes are atoms of the same element with different masses whose nuclei release radiation because they are unstable
- Non-radioactive** isotopes are atoms of the same element with different masses and stable nuclei

The similarities and differences between isotopes are summarised in this table:

Property Of Isotope	Similar Property	Different Property
Number of protons	✓	✗
Number of electrons	✓	✗
Number of neutrons	✗	✓
Atomic number	✓	✗
Mass number	✗	✓
Chemical property	✓	✗

Exam tip
If you have been asked to draw the electron configuration of an ion then you have to make sure that you count the right number of electrons. Positive ions have less electrons while negative ions have extra electrons.



Exam tips

Important Definition

Key terms in **Pink**

3.5 Using Isotopes

Isotopes have similar chemical properties because they have the same number of valence electrons

Isotopes have two major applications:

- Medical uses:** killing cancer cells and sterilising medical equipment
- Industrial uses:** **uranium - 235** is used to generate electricity in a nuclear power station



Extended syllabus

Mark scheme points

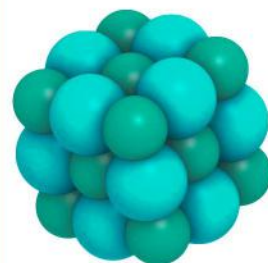
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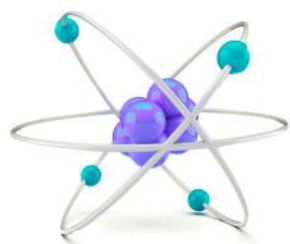
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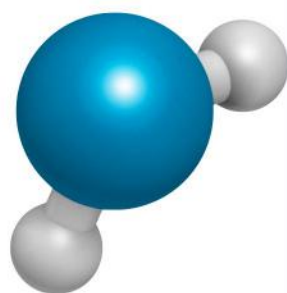
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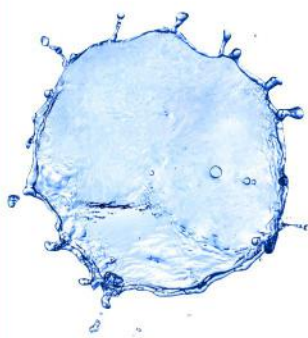
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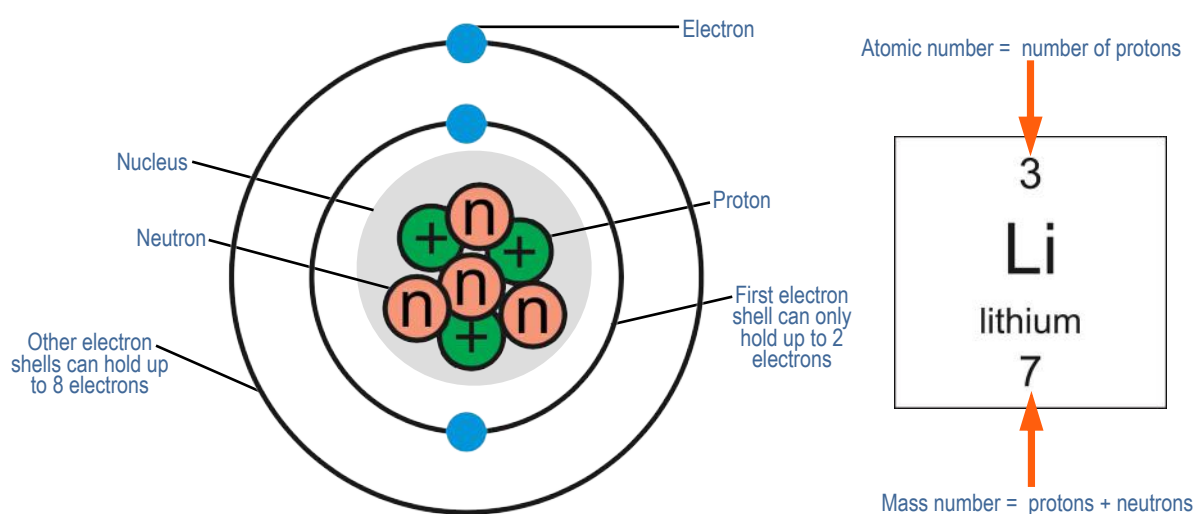
Atomic Structure



3.1 The Subatomic Particles

- * The atom is the smallest component of an element
- * The atom is made of two main regions: **the nucleus** in the centre and **electron shells** around
- * Atoms are made of three smaller components, also known as **subatomic particles**

Subatomic Particle	Symbol	Charge	Mass	Location
Proton	H ⁺	1+	1	Nucleus
Neutron	n ⁰	0	1	Nucleus
Electron	e ⁻	1-	Negligible (almost zero)	Electron shells



3.2 Atomic Structure Rules

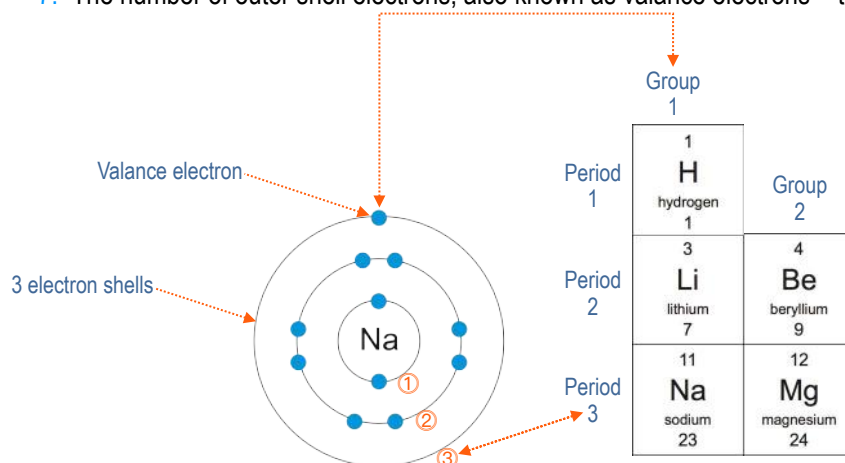
- * Atoms have no net charge or neutral because **the number of protons = the number of electrons**
- * **The number of protons in the atom = the atomic number** of the element in the Periodic Table
- * **Element:** a substance made of atoms with the same atomic number
- * The number of protons of the element never changes; it determines the identity of the element
- * **Elements in the Periodic Table are organised by their atomic numbers**
- * The number of protons + neutrons = the mass number (also known as the **nucleon number**)
- * The number of neutrons could change for the same element, and so is the mass (nucleon) number
- * Atoms that have **the same proton number but different number of neutrons are called isotopes** (page: 16)
- * The number of electrons does change; atoms with more or fewer electrons than protons are called **ions**
- * Atoms that have more electrons than protons are negative ions also called **anions**
- * Atoms that have fewer electrons than protons are positive ions also called **cations**
- * **Electrons start filling the inner shell from the nucleus first**; this shell can have 1 or 2 electrons
- * Every other shell in the atom can have a maximum of 8 electrons
- * Outer shell electrons are called valence electrons
- * **The number of valence electrons = the group number**
- * **Example:** the element lithium (Li), in the diagram, has two electron shells and one outer shell electron; therefore, lithium is found in period 2 and group 1



3.3 Electron Configuration Of Atoms

✳ Follow these steps to draw the electron configuration (arrangement) of an atom:

1. Draw the nucleus with the symbol of the element in the centre
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Exam tip

If you have been asked to draw the electron configuration of an ion then you have to make sure that you count the right number of electrons. Positive ions have less electrons while negative ions have extra electrons

Hosni

3.4 Isotopes

✳ **Isotopes** are atoms of the same element with the same proton number but a different nucleon number

✳ Isotopes are written using their symbol and the mass number (to the upper left) and atomic number (to the lower left); for instance, the sodium (Na) isotope is written as $^{23}_{11}\text{Na}$

✳ There are two types of isotopes:

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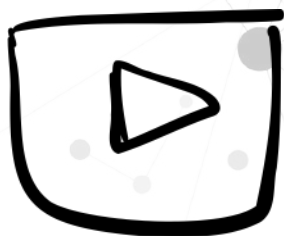
3.5 Using Isotopes

✳ Isotopes have **similar chemical properties** because they have the *same number of valance electrons*

✳ Isotopes have two major applications:

- Medical uses:** killing cancer cells and sterilising medical equipment
- Industrial uses:** **uranium - 235** is used to generate electricity in a nuclear power station

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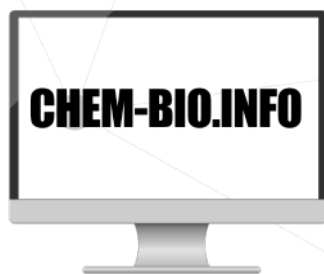
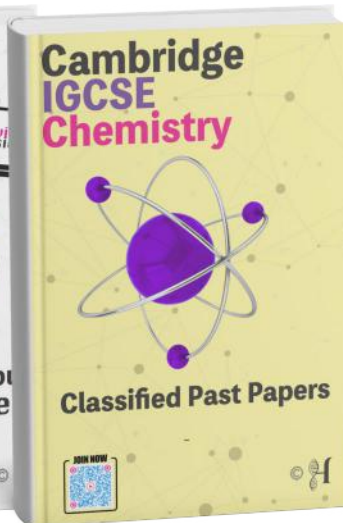
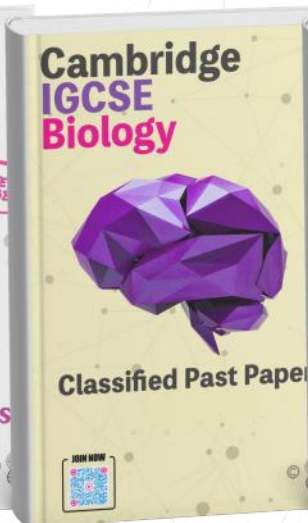
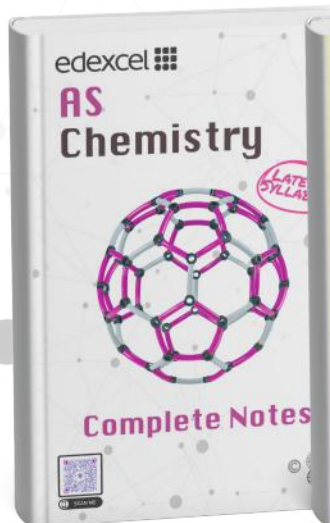


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