

Exercise walk-through

Atomic structure and the Periodic Table ■ 2.2

eXercise

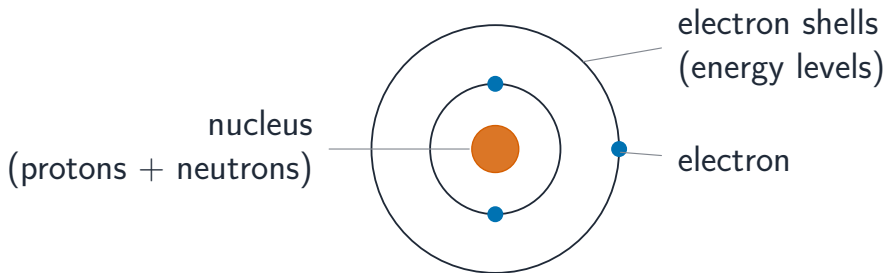
You must be able to

- give the relative mass and charge of protons, neutrons, electrons
- find protons, neutrons and electrons from proton and mass numbers
- write electronic configurations and link them to Group and Period

Method — Configuration and the Periodic Table

- **proton +1, neutron 0, electron -1**; neutrons = mass number - proton number.
- **Group** = outer-shell electrons; **Period** = number of shells.
- e.g. sodium 2, 8, 1 → Group I, Period 3.

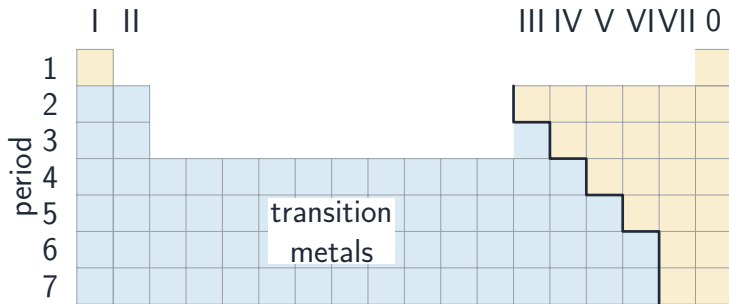
Method — Configuration and the Periodic Table



lithium, Li: 3 protons, 4 neutrons
electron configuration 2,1

A lithium atom: nucleus of protons and neutrons, electrons in shells

Method — Configuration and the Periodic Table



■ metals ■ non-metals — metal / non-metal line

Electron arrangement explains an element place in the Periodic Table

Practice 2.1 ■ 1 mark

State the relative charge of a neutron.

Solution 2.1

Worked steps

0 (neutral) **B1**.

Practice 2.2 ■ 1 mark

Write the electronic configuration of calcium (proton number 20).

Solution 2.2

Method: Configuration and the Periodic Table

Worked steps

2, 8, 8, 2 **B1**.

Exam-style 3.1 ■ 1 mark

An atom has the configuration 2, 8, 7. It is in:

- A** Group II, Period 7
- B** Group VII, Period 3
- C** Group VII, Period 2
- D** Group III, Period 7

Solution 3.1

Method: Configuration and the Periodic Table

- A Group II, Period 7
- B Group VII, Period 3**
- C Group VII, Period 2
- D Group III, Period 7



Worked steps

B. Outer shell 7 $\rightarrow$ Group VII; three shells $\rightarrow$ Period 3.

Exam-style 3.2 ■ 3 marks

An atom of aluminium has proton number 13 and mass number 27.

- (a) State the number of protons, neutrons and electrons.
- (b) Write its electronic configuration.

Solution 3.2

Method: Configuration and the Periodic Table

Worked steps

(a) protons = 13; neutrons = $27 - 13 = 14$; electrons = 13 **B1** **B1** **B1**.

(b) 2, 8, 3 **B1**.

Exam-style 3.3 ■ 2 marks

Explain why an atom has no overall electric charge.

Solution 3.3

Worked steps

it has equal numbers of protons (+1) and electrons (−1) **M1**; so the positive and negative charges cancel **A1**.