

1: Which row shows the numbers of neutrons and electrons in a bromide ion $^{79}\text{Br}^-$?

	Number of neutrons	Number of electrons
☐ A	44	35
☐ B	44	36
☐ C	46	35
☐ D	46	36

(Total for Question 1 = 1 mark)

6 This question is about electronic configurations.

(a) What is the electronic configuration of an atom of calcium?

(1)

- ☐ A [Ne] $3s^1$
- ☐ B [Ar] $4s^1$
- ☐ C [Ne] $3s^2$
- ☐ D [Ar] $4s^2$

(b) What is the electronic configuration of a Cr^{3+} ion?

(1)

- ☐ A [Ar] $3d^2 4s^1$
- ☐ B [Ar] $3d^3$
- ☐ C [Ar] $3d^4$
- ☐ D [Ar] $3d^5$

(Total for Question 6 = 2 marks)

2 What is the shape of a p orbital and the maximum number of electrons it can hold?

	shape	maximum number of electrons
☒ A		2
☒ B		6
☒ C		2
☒ D		6

(Total for Question 2 = 1 mark)

10 Which is the electronic configuration of chromium?

- ☒ A [Ar] $\overset{3d}{\uparrow\downarrow \uparrow\downarrow } \overset{4s}{\uparrow\downarrow}$
- ☒ B [Ar] $\overset{3d}{\uparrow \uparrow \uparrow \uparrow} \overset{4s}{\uparrow\downarrow}$
- ☒ C [Ar] $\overset{3d}{\uparrow \uparrow \uparrow \uparrow} \overset{4s}{\uparrow}$
- ☒ D [Ar] $\overset{3d}{\uparrow \uparrow \uparrow \uparrow} \overset{4s}{\uparrow\uparrow}$

(Total for Question 10 = 1 mark)

9 The table shows some data about fundamental particles in an atom.

Particle	Mass / g
electron	0.0009×10^{-24}
neutron	1.6748×10^{-24}
proton	1.6725×10^{-24}

(a) An atom of hydrogen can be represented as ${}^1\text{H}$.

What is the mass, in grams, of this hydrogen atom?

(1)

- ☐ **A** 1.6725×10^{-24}
- ☐ **B** 1.6734×10^{-24}
- ☐ **C** 3.3473×10^{-24}
- ☐ **D** 3.3482×10^{-24}

(b) Which of the particles would be deflected by an electric field?

(1)

- ☐ **A** electrons only
- ☐ **B** electrons and protons only
- ☐ **C** neutrons and protons only
- ☐ **D** electrons, neutrons and protons

(Total for Question 9 = 2 marks)

2 Which diagram represents the electronic structure of a nitrogen atom?

	1s	2s	2p		
☐ A	$\uparrow\downarrow$	$\uparrow$	$\uparrow\downarrow$	$\uparrow$	$\uparrow$
☐ B	$\uparrow\downarrow$	$\uparrow$	$\uparrow\downarrow$	$\uparrow\downarrow$	
☐ C	$\uparrow\downarrow$	$\uparrow\downarrow$	$\uparrow$	$\uparrow$	$\uparrow$
☐ D	$\uparrow\downarrow$	$\uparrow\downarrow$	$\uparrow\downarrow$	$\uparrow$	

(Total for Question 2 = 1 mark)

4 What is the electronic configuration of an oxygen atom in its ground state?

	1s	2s	2p _x	2p _y	2p _z	3s
☒ A	↑↓	↑↓	↑↓	↑↓		
☒ B	↑↓	↑↓	↑↑	↑	↑	
☒ C	↑↓	↑↓	↑	↑	↑	↑
☒ D	↑↓	↑↓	↑↓	↑	↑	

(Total for Question 4 = 1 mark)

3 Which species does **not** contain a total of 16 neutrons?

- ☒ A a molecule of ethene, $^{12}\text{C}_2\text{H}_4$
- ☒ B a molecule of oxygen, $^{16}\text{O}_2$
- ☒ C an atom of silicon, ^{30}Si
- ☒ D an ion of sulfur, $^{32}\text{S}^{2-}$

(Total for Question 3 = 1 mark)

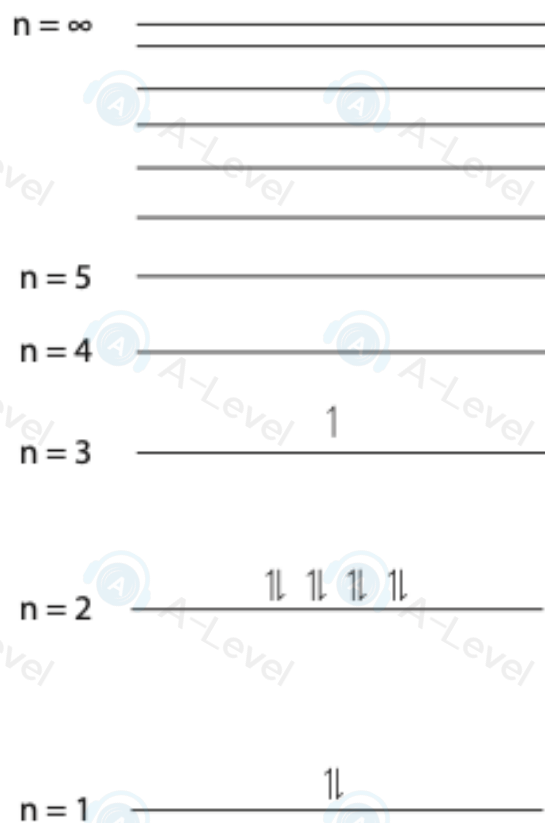
1 An atom of $^{27}_{13}\text{Al}$ forms the ion, Al^{3+} .

What are the numbers of protons, electrons and neutrons in this ion?

	protons	electrons	neutrons
☒ A	13	13	14
☒ B	10	13	14
☒ C	14	10	13
☒ D	13	10	14

(Total for Question 1 = 1 mark)

22 The diagram shows the arrangement of electrons in the energy levels of a sodium atom.



- (a) Give the reason why the two electrons in the $n = 1$ energy level are represented by arrows pointing in opposite directions.

(1)