A-Level Chemistry: **w25 11**

Question 1 (Answer: **B**)

- Aluminium has 13 electrons when neutral: $1s^2 2s^2 2p^6 3s^2 3p^1$.
- The + charge means one electron has gone, and it leaves from the highest-energy 3p orbital first.
- That leaves 12 electrons: $1s^2 2s^2 2p^6 3s^2$.

A-Level Chemistry: **w25 12**

Question 1 (Answer: **D**)

- Iron is $[Ar]3d^6 4s^2$, and when it ionises the 4s electrons leave *first*.
- Fe^{3+} has lost both 4s electrons and one 3d, leaving $[Ar]3d^5$.
- Five electrons in five 3d orbitals means one in each, all unpaired, with 4s empty.

Question 4 (Answer: **C**)

- Ca 40.1 + C 12.0 + 3× O 16.0 = 100.1.
- A confuses relative *isotopic* mass (exactly 35 for ^{35}Cl) with the relative atomic mass 35.5.
- B gives the mass of one O atom rather than the O_2 molecule, and D quotes magnesium's relative atomic mass for a single isotope.

A-Level Chemistry: **w25 13**

Question 1 (Answer: **B**)

- Aluminium has 13 electrons when neutral: $1s^2 2s^2 2p^6 3s^2 3p^1$.
- The + charge means one electron has gone, and it leaves from the highest-energy 3p orbital first.
- That leaves 12 electrons: $1s^2 2s^2 2p^6 3s^2$.

A-Level Chemistry: **w25 22**

1(a)(i)	25 protons 30 neutrons 25 electrons
1(a)(ii)	(atoms of an element) with the same number of protons and different number of neutrons
1(a)(iii)	**M1** (relative) isotopic mass. **OR** (relative isotopic) mass of Mn-55 and Mn-53 **M2** (relative) abundance of each isotope
1(b)(i)	$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ (3d^5\ 4s^2)$
1(b)(ii)	5
1(c)(i)	Mn / MnO_2 **AND** it gains electrons
1(c)(ii)	(+)4
1(c)(iii)	*Due to an issue with question 1(c)(iii), the question has been removed from the question paper.*