

1 Atomic structure – Part 2 — Answers

Answers

Work through these after trying the questions yourself.

1.1 (a) 2 \ (b) 6 \ (c) 10.

1.2 4s fills first.

1.3 $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$.

1.4 The energy to remove one electron from each atom in one mole of gaseous atoms, forming one mole of gaseous +1 ions: $X(g) \rightarrow X^+(g) + e^-$.

1.5 The nuclear charge rises while the shielding stays about the same, so the outer electrons are held more tightly.

1.6 Each step down adds a shell, so there is more shielding and a larger atomic radius — both weaken the pull on the outer electron.

1.7 Magnesium's outer electron is removed from a 3s sub-shell, but aluminium's is removed from a 3p sub-shell, which is slightly higher in energy (and shielded a little by the 3s electrons). So aluminium's outer electron is easier to remove, giving a lower first ionisation energy.