AQA AS/A-level Year 1 Chemistry exam practice answers

**1 Atomic structure**

**1 (a)** 1*s*2, 2*s*2, 2*p*6, 3*s*2 [1]

**(b) (i)** First ionisation energy is defined as the energy required to remove one mole of electrons [1] from one mole of gaseous [1] atoms.

**(ii)** Al+(g) → Al2+(g) + e− [1] for correct equation; [1] for gas phase

**(iii)** The second ionisation energy involves removing an electron from an Al+ ion [1] so there will be a stronger electrostatic attraction as the electron being removed is nearer to the nucleus/Al+ is smaller than Al [1]

**(c) •** First ionisation energy generally increases [1]

**•** Nuclear charge increases [1]

**•** Extraelectron in the same energy level/same shielding [1]

**(d)** Sulfur has two electrons paired in the same orbital [1]; electron repulsion takes place and lowers the ionisation energy [1]

**(e)** Potassium has an extra energy level [1]; outer electron is further from the nucleus/more shielding [1]

**2** abundance of third isotope = 100 − 91.0 − 1.8 = 7.2% [1]

((32 × 91) + (33 × 1.8) + (*y* × 7.2))/100 = 32.16 [1]

7.2*y* = (32.16 × 100) − (32 × 91) − (33 × 1.8) = 244.6 [1]

*y* = 244.6/7.2 = 33.97

*y* = 34 [1]

**3** D [1]