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

**8 Periodicity**

**1** **(a)** Large jump in ionisation energies between 3rd and 4th electron, so three electrons in outer shell (group 3) [1]

 **(b) (i)** Anything lower than 577 kJ mol−1 [1]

 **(ii)** The electron being removed is in a higher energy level [1]; further from the nucleus/more shielding [1]; the electrostatic attraction decreases

 **(c) (i)** W and Z would have higher first ionisation energies compared with X, so anything higher than 577 kJ mol−1 [2]

 **(ii)** The outer electron in X comes from a p-orbital that is slightly further [1] from the nucleus than in W, so the ionisation energy decreases for X compared with W

 Z has a higher nuclear charge than X [1] with electrons entering the same energy level

**2 (a) (i)** A general increase [1]

 **(ii)** A general decrease [1]

 **(b)** For the metals — a general increase [1]; group 4 will be very high, and then drops to group 5 and increases slightly to group 7 due to van der Waals’ forces [1]

**3 (a)** Sodium has more energy levels [1]; the outer electron in sodium is further from the nucleus [1] and hence the atom is larger

 **(b)** Silicon has a giant covalent structure held together by strong covalent bonds [1]; phosphorus is simple covalent, so molecules are attracted by weak van der Waal’s forces [1]

**4** C [1]

**5** D [1]