Edexcel AS Chemistry Exam practice answers

4A: Group 2 elements

1 (a) B (✓)

(b) B (✓)

(c) (i) Ca(NO3)2 → CaO + 2NO2 + ½O2 (or double) (✓)

(ii) CaO + 2HCl → CaCl2 + H2O (✓)

(iii) Mg + H2O → MgO + H2 (✓)

(d) C (✓)

(e) The Sr2+ ion has a smaller radius than the Ba2+ ion; (✓) so it is more polarising; (✓)so strontium nitrate is more easily decomposed

2. (a) Dip a hot platinum (or nichrome) wire in clean concentrated; HCl (✓) and then into each substance in turn; and then into the hottest part of a Bunsen flame; (✓) cleaning the wire between each test. The substance that turns the flame carmine-red is LiCl; (✓) the one that turns the flame yellow is NaCl; (✓) the one that turns the flame apple green is BaCl2 (✓)

(b) The heat of the flame vaporises sodium chloride; producing Na and Cl *atoms*; (✓) one electron is promoted into an orbital of the fourth shell in some of the sodium atoms (✓) these electrons then fall back to the ground state; (✓) which is the 3s-orbital; energy is given out in the form of light; (✓) the flame is yellow because the energy difference between the fourth shell orbital and the 3s-orbital is equivalent to the yellow line in the spectrum (✓)

(c) B (✓)

4B: Group 7 elements

1 (a) B (✓)

(b) B (✓)

(c) (i) Cl2 + H2O  HOCl + H+ + Cl− (✓) (allow 2H+ + OCl− + Cl−)

(ii) ½Cl2(aq) + I−(aq) → ½I2(aq) + Cl−(aq) (or doubled) (✓) solution goes red-brown/ grey precipitate; (✓) (if chlorine in excess)

(d) (i) C (✓)

(ii) NH3(g) + HCl(g) → NH4Cl(s) species (✓) state symbols (✓)

(e) They increase Cl2 to I2; (✓) as the number of electrons in the molecule increases; (✓) resulting in stronger London forces; (✓) (more energy required to separate the molecules)

2 (a) (i) When an element in a single species; (✓) is simultaneously oxidised and reduced (✓)

(ii) Either 3ClO− → ClO3− + 2Cl−; (✓) or 2ClO2 + 2OH− → ClO2− + ClO3− + H2O

(b) (i) +7 (✓)

(ii) Chlorine is always in a positive oxidation state in oxyanions (✓) such as ClO3−. Fluorine is the most electronegative element; (✓) so can never form oxyanions with fluorine having to be in a positive oxidation state (✓)

(c) ½I2 + At− → ½At2 + I− (or doubled) (✓)

4B: Analysis of inorganic compounds

1 (a) Do a flame test; (✓) it will give a carmine-red colour to the flame (✓)

(b) A (✓)

(c) Dip a clean platinum/ nichrome wire in concentrated hydrochloric acid; (✓) then into a flame. Repeat until there is no colour to the flame; (✓) then dip in concentrated HCl and then into the solid and put into the hottest part of the flame (✓)