Topic 6 – Redox Reactions and Group Chemistry (Paper 1 only)

* I can explain that redox reactions involve a transfer of electrons from the reducing agent to the oxidising agent
* I can define oxidation is the process of electron loss and oxidizing agents as electron acceptors
* I can define reduction as the process of electron gain and reducing agents as electron donors
* I can work out the oxidation state of an element in a compound or ion from the formula
* I can use the change in the oxidation state of an element in a compound or ion to identify the element that has been oxidised or reduced in a given reaction
* I can write separate half-equations for oxidation or reduction processes in redox reactions
* I can combine half-equations to give an overall equation for any redox reaction
* I can state that the elements in Group 2 are called the alkaline earth metals
* I can state and explain the trends in atomic radius, first ionisation energy of the elements Mg–Ba
* I can state and explain the trends in melting point of the elements Mg–Ba in terms of their structure and bonding
* I can write equations for reactions of the elements Mg–Ba with water
* I can describe the relative solubilities of the hydroxides and sulfates of the elements Mg–Ba in water; Mg(OH)2 is sparingly soluble; BaSO4 is insoluble
* I can explain how the trends in the solubilities of the hydroxides and the sulfates of these elements are linked to their use; Mg(OH)2 in medicine, Ca(OH)2 in agriculture, MgSO4 and BaSO4 in medicine
* I can explain why BaCl2 solution is used to test for sulfate ions and why it is acidified
* I can describe the use of CaO or CaCO3 to remove SO2 from flue gases
* I can describe the use of magnesium in the extraction of titanium from TiCl4
* I can describe the halogens in Group 7 as very reactive non-metals
* I can explain the trend in electronegativity in the halogens
* I can explain the trend in boiling point of the halogens in terms of their structure and bonding
* I can describe the trend in oxidising ability of the halogens down the group, including displacement reactions of halide ions in aqueous solution
* I can describe the trend in reducing ability of the halide ions, including the reactions of solid sodium halides with concentrated sulfuric acid
* I can describe the use of acidified silver nitrate solution to identify and distinguish between halide ions and explain why the silver nitrate solution is acidified
* I can explain the trend in solubility of the silver halides in ammonia and explain why ammonia solution is added after acidified silver nitrate
* I can describe the reaction of chlorine with water to form chloride ions and chlorate(I) ions
* I can describe the reaction of chlorine with water to form chloride ions and oxygen
* I can appreciate that society assesses the advantages and disadvantages when deciding if chemicals should be added to water supplies
* I can describe the use of chlorine in water treatment
* I can appreciate that the benefits to health of water treatment by chlorine outweigh its toxic effects
* I can describe reaction of chlorine with cold, dilute, aqueous NaOH and uses of the solution formed
* I can carry out simple test-tube reactions to identify Mg2+, Ca2+, Sr2+, Ba2+, NH4+,OH-, CO32- and SO42- (Required Practical 4)