Topic 16 – Aldehydes, Ketones and Optical Isomerism

* I can state that optical isomerism is a form of stereoisomerism and occurs

as a result of chirality in molecules, limited to molecules with a single chiral centre (asymmetric carbon atom)

* I can explain that optical isomers (enantiomers) exist as non-superimposable

mirror images and that they differ in their effect on plane polarised light

* I can state that a mixture of equal amounts of enantiomers is called a racemic mixture (racemate)
* I can recognise the presence of a chiral centre and draw the structural formulas and displayed formulas of enantiomers
* I can explain how racemic mixtures (racemates) are formed and why they are optically inactive
* I can describe the oxidation of aldehydes to carboxylic acids and use Fehling’s and Tollen’s reagents to distinguish between aldehydes and ketones
* I can describe for reduction reactions of aldehydes (to primary alcohols) and ketones (to secondary alcohols) using NaBH4 in aqueous solution
* I can write overall equations for reduction reactions of aldehydes and ketones using [H] as the reductant
* I can outline the nucleophilic addition mechanism for reduction reactions with NaBH4 (the nucleophile should be shown as H-)
* I can write overall equations for the formation of hydroxynitriles using HCN
* I can outline the nucleophilic addition mechanism for the reaction with KCN followed by dilute acid
* I can explain why nucleophilic addition reactions of KCN, followed by dilute acid, can produce a mixture of enantiomers
* I can describe the hazards of using KCN