3.3.7 Optical Isomerism

★ A-LEVEL ONLY — not examined at AS level

3.3.7	*Optical isomerism: chirality, asymmetric carbon, enantiomers, racemic mixtures.*

Optical isomerism: a molecule has a chiral centre — a carbon bonded to four different groups.

Enantiomers: non-superimposable mirror images. Identical physical properties, but rotate plane-polarised light in opposite directions (+/–).

Racemic mixture (racemate): 50:50 mix of both enantiomers → no net optical rotation.

Racemic mixtures form when a planar intermediate (carbocation or trigonal planar C=O) is attacked equally from both sides.

Importance in medicine: one enantiomer may be pharmacologically active while the other is inactive or harmful.