

Fields of advanced difficulty

Theoretical

1. Stereochemistry Newman projections; models for control of addition of new stereocentres (Felkin-Anh, Zimmerman-Traxler); geometrical isomers of square planar and octahedral transition metal complexes; recognising isomer possibilities in molecules with multiple stereocentres.
2. Enzymes Enzyme classification according to reaction types; isotope-labelling studies; metabolic pathways involving coenzyme A.
3. Phase and chemical equilibria Latent heats and the Clausius-Clapeyron equation; colligative properties; temperature dependence of equilibrium constants.
4. Analytical techniques Mass spectrometry (molecular ions, fragmentation, isotope distribution); interpretation of IR data.
5. Photochemistry Photocatalysis; band gaps; quantum yields; semiconductors.
6. MO theory MO diagrams for diatomics; metal-ligand interactions.

The following topics will not appear at IChO 2025:

Formal group theory
 Planar, axial, or helical chirality
 Enzymatic kinetics
 Quantitative understanding of any isotope effects
 Kinetics of complex reactions
 Steady state and quasi equilibrium approximations
 NMR spectroscopy
 Synthetic polymers
 Photocatalytic organic mechanisms
 Pericyclic organic mechanisms
 Crystal field theory
 Thermodynamics and kinetics of adsorption
 Solid state crystal structures

Students are not expected to:

Remember metabolic pathways by heart

Practical

1. Vacuum filtration
2. Thin layer chromatography
3. Microscale reactions Use of a micropipette and a 96 well plate

The following topics will not appear at IChO 2025:

Extraction with immiscible solvents
 Determination of magnetic moments

Students are not expected to:

Use a spectrophotometer themselves