EngineeringRise

Werner theory, ligands, coordination number and chelation

Formulas and units, JEE Main. Status: Reviewed on 2026-11-20.

Result	Formula	Units or note
Coordination number	sum over ligands of (number x denticity) Valid when: counts donor atoms bonded to the metal; ambidentate ligand counts 1	dimensionless integer
Oxidation state of metal	overall charge - sum of (number x ligand charge) Valid when: known ligand charges and overall charge of the complex	dimensionless integer
Outer chloride (CoCl3.nNH3)	3 - (6 - n) for n between 3 and 6 Valid when: coordination number 6, all NH3 as ligands, remaining Cl fills the sphere	mol per mol of compound
Moles of AgCl	moles of compound x outer chloride Valid when: excess AgNO3; only outer-sphere chloride precipitates at once	mol
Ions per formula unit	1 + number of outer ions (0 if none outside) Valid when: complex ion stays intact in water; outer ions dissociate	dimensionless integer
Chelate rings	number of ligands x (denticity - 1), for denticity above 1 Valid when: each chelating ligand bonded through all its donor atoms (denticity > 1)	dimensionless integer
Common denticities	en 2, ox 2, gly 2, dien 3, edta 6, NH3 1, H2O 1	dimensionless integer

Full lesson with worked examples:
https://www.engineeringrise.in/learn/learn/jee-main/chemistry/coordination-compounds/werner-theory-ligands-coordination-number-

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