

Topic	Comments
13 Nuclear Magnetic Resonance Spectroscopy	
13.1 Nuclear Spin States	Energy states and their orientation; spin #'s; units for magnetic field;
13.2 Orientation of Nuclear Spins in an Applied Magnetic Field	effect of nuclear spins in magnetic fields
13.3 Nuclear Magnetic Resonance	concept of resonance; signals; diamagnetic current; shielding-desielding; ppm & TMS
13.4 An NMR Spectrometer	basic parts
13.5 Equivalent Hydrogens	be able to label classify; upfield & downfield
13.6 Signal Areas	integration and its use
13.7 Chemical Shift	electronegativity effects; hybridization and diamagnetic effects; ring current
13.8 Signal Splitting and the (n + 1) Rule	application and use
13.9 The Origins of Signal Splitting	theory of splitting and recognition of patterns (s, d, t, etc); multiple splittings
13.12 Interpretation of NMR Spectra	Major functional groups; splitting patterns; multiple splitting
15 Organometallic Compounds	
15.1 Organomagnesium and Organolithium Compounds	Rxns with carbonyls & epoxides (Mechanism)
15.2 Lithium Diorganocopper (Gilman) Reagents	Coupling with halides
15.3 Carbenes and Carbenoids	Insertion reactions: carbene & dihalocarbenes; Simmons-Smith rxn
16 Aldehydes and Ketones	
16.1 Structure and Bonding	Polarity properties; bond characteristics
16.2 Nomenclature	trivial names of compounds on slides; basic nomenclature
16.3 Physical Properties	solubility trends; BP & or MP trends
16.4 Reactions	Reaction theme: addition to give tetrahedral intermediate
16.5 Addition of Carbon Nucleophiles	Grignards; R-Li; acetylide; cyanide-use of cyanohydrins (mechanisms)
16.6 The Wittig Reaction	use with carbonyls
CUT-OFF for XM 1	
16.7 Addition of Oxygen Nucleophiles	Hydrates; hemi-acetal; acetal formation & hydrolysis; mechanisms
16.8 Addition of Nitrogen Nucleophiles	imines and enamines-formation and hydrolysis; mechanism
16.9 Keto-Enol Tautomerism	acidity of α hydrogens (significance)
16.10 Oxidation	RHO & ROH-use of all Cr ⁺⁶ reagents; Silver oxide; O ₂
16.11 Reduction	metal hydride reductions; cat H ₂ ; Clemmenson; Wolff-Kishner
16.12 Reactions at an α -Carbon	racemization- mechanism ; halogenation, acidic & basic conditions- mechanism