CHEM – 647

Organic synthesis



Dr. Humaira Yasmeen Gondal

Department of Chemistry
University of Sargodha



RETROSYNTHETIC ANALYSIS

1,1 DISCONNECTIONS

DISCONNECTIONS OF SIMPLE ALCOHOLS

Nucleophilic addition to the carbonyl group

(Previous Knowledge)

Organic Chemistry by Clayden

E US E

Nucleophilic addition to the carbonyl group

(Previous Knowledge)

Nucleophilic attack by 'hydride' on aldehydes and ketones

Addition of organometallic reagents to aldehydes and ketones

Organic Chemistry by Clayden



Addition of organometallic reagents to aldehydes and ketones

Organic Chemistry by Clayden



Nucleophilic addition to the carbonyl group

(SUMMARY)

0	4	но н	Bonds Formed	Bonds Broken
R.H.	1. "Nucleophile"	→ RXNu	C-Nu	C-O (π)
("acid workup", "H+", "H ₃ O+", etc.)		"H+",	О-Н	
Reaction		Nucleophile	Product	
Grignard Reaction		R-MgX	R R	
Addition of Organolithiums		R-Li	HO H	
Reduction by sodium borohydride (NaBH ₄)		⊕ ⊖ Na H-BH 3	HO H	
Reduction by lithium aluminum hydride (LiAIH ₄)		⊕ ⊖ Na H-AIH ₃	HO H	
Addition of cyanide ion to form cyanohydrins		⊖ _{: CN}	HO H CN	
Addition of hydroxide ion to form hydrates		⊖: ÖH	HO H OH	
Addition of alkoxide ions to form hemiacetals		⊖. ÖR	HO H OR	



ONE GROUP DISCONNECTIONS

Disconnection

Synthesis NaCN (Reagents)



Target Molecule

Ph O H

Disconnection

Synthesis

CH=CH
$$\xrightarrow{\text{Na}}$$
 CH=C $\xrightarrow{\text{PhCOMe}}$ TM



Target Molecule

Disconnection

Synthesis



Target Molecule

Disconnection

