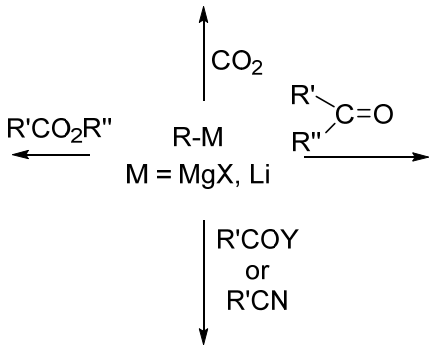
4. CARBANION CHEMISTRY

1. Fill in the table below (MS4, CS).

Metal	Formula of organometallic reagent	Preparation	Properties and reactivity (stability, aggregation, reactions with solvents etc.)	Examples
Mg				
Li				
Zn				
Cd				
Hg				
Cu				

2. Complete the scheme below (CS).

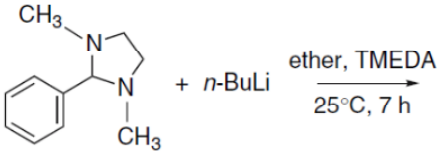


3. Fill in the table below.

Abbreviation	Name	Formula	Applications
DABCO			
TMEDA	tetramethylenediamine		
HMPA	hexamethylphosphorotriamide		
DMPU	N,N-dimethylpropyleneurea		

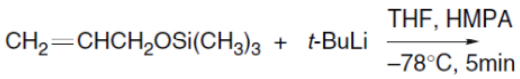
4. Predict the product of the following reactions (CS).

a)



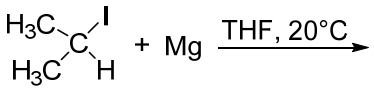
T. D. Harris and G. P. Roth, *J. Org. Chem.,* **1979**, *44*, 2004.

b)

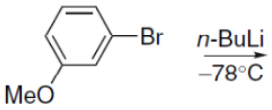


W. C. Still and T. L. Macdonald, *J. Org. Chem.,* **1976**, *41*, 3620.

c)

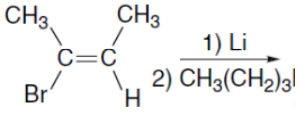


d)



T. R. Hoye, S. J. Martin, and D. R. Peck, *J. Org. Chem.*, **1982**, *47*, 331.

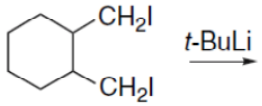
e)



J. Millon, R. Lorne, and G. Linstrumelle, *Synthesis*, **1975**, 434.

5. On the basis of the reference, provide the product of the following reaction.

W. F. Bailey, R. P. Gagnier, and J. J. Patricia, *J. Org. Chem.*, **1984**, *49*, 2098.



6. Ketone *p*-toluenesulfonylhydrazones are converted to alkenes on treatment with strong bases such as an alkyllithium or lithium dialkylamide (Shapiro reaction). Discuss the Shapiro reaction described in *JACS*, **1967**, *89*, 5734.

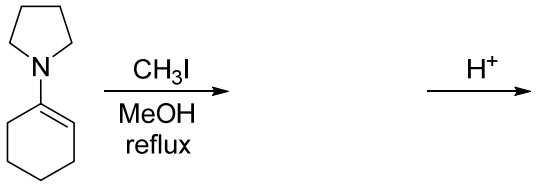
7. Fill in the table below.

Condensation/reaction	Reagents and reactants	Products	Important information
Aldol			
Claisen			
Dieckmann			
Perkin			
Michael			
Knoevenagel			
Morita-Baylis-Hillman			
Erlenmeyer-Plöchl			
Thorpe-Ziegler			

8. On the basis of the references below, discuss the results of the following reactions.

J. Am. Chem. Soc. **1954**, *76*, 2029; *J. Am. Chem. Soc.* **1956**, *78*, 5128.

a)



b)