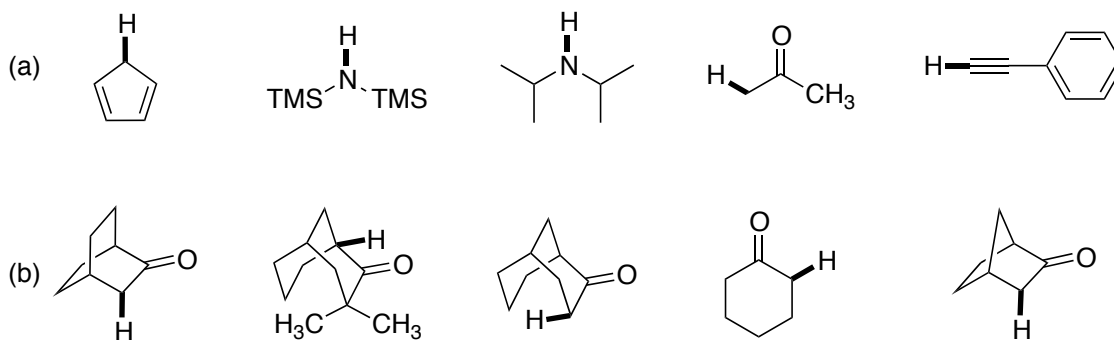


Name \_\_\_\_\_

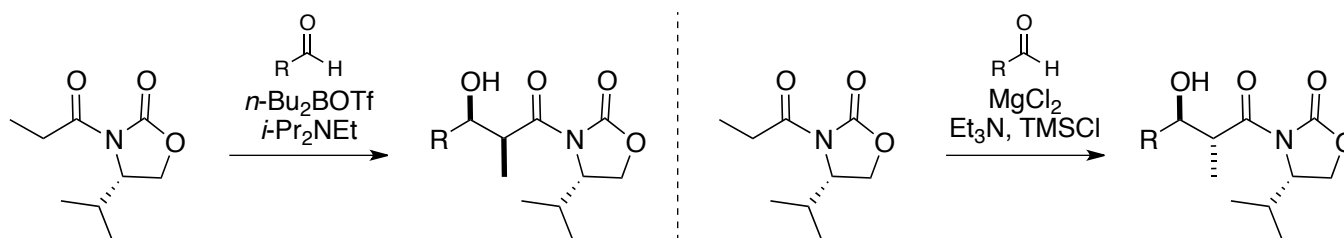
1. (1) Put these compounds in the ascending order of pKa values in DMSO.  
 (ex.  $\text{H}_2\text{SO}_4$   $\text{CF}_3\text{CO}_2\text{H}$   $\text{CH}_3\text{CH}_2\text{OH}$   $(\text{CH}_3\text{CH}_2)_2\text{NH}$   $\text{H}_2\text{C}=\text{CH}_2$ )



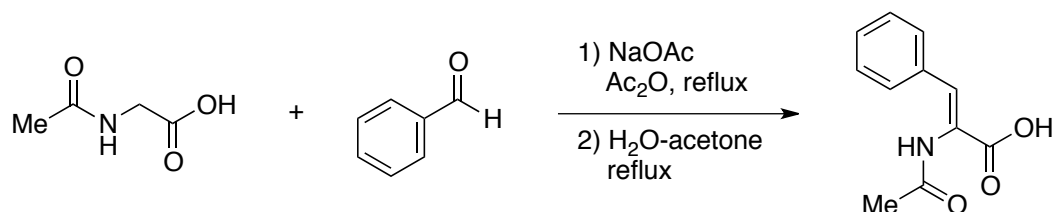
- (2) Put these compounds in the ascending order of pKb values in DMSO, but show us structures of these base.

DBN      Hunig's base      2,6-lutidine      DMAP      tetrazole      imidazole

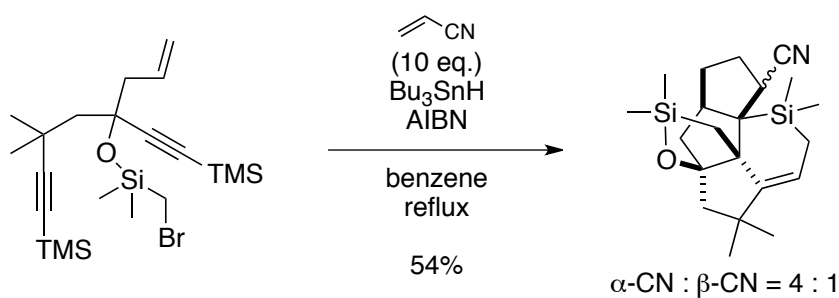
- (3) Explain why these aldol reactions have excellent stereoselectivity.



2.

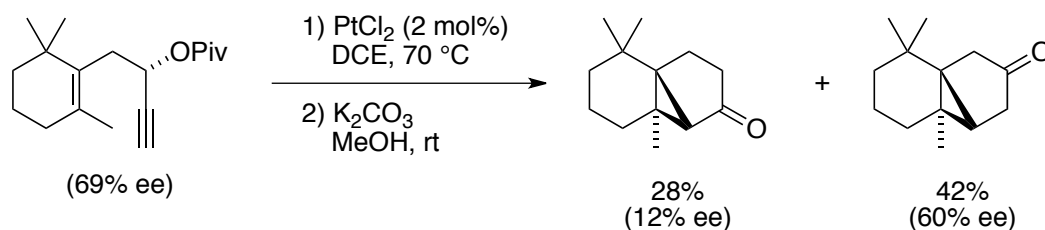


3.



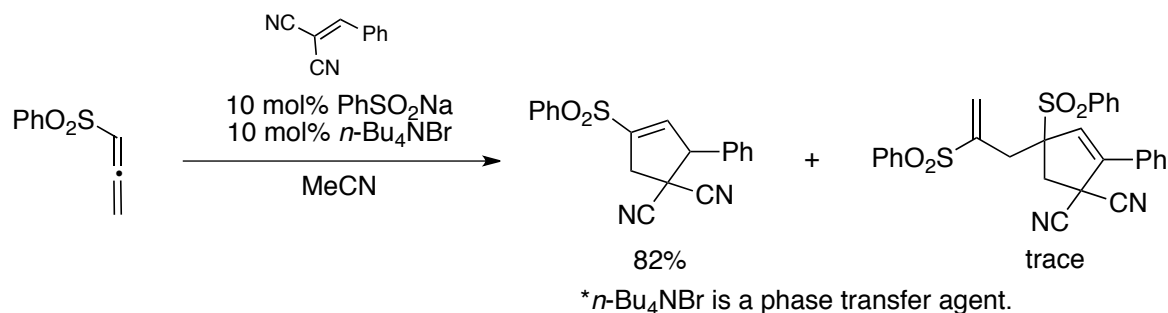
problem 07/06/2019 Q2  
 M. Malacria *et al.*, *J. Org. Chem.*, **63**, 6764 (1998)

4.



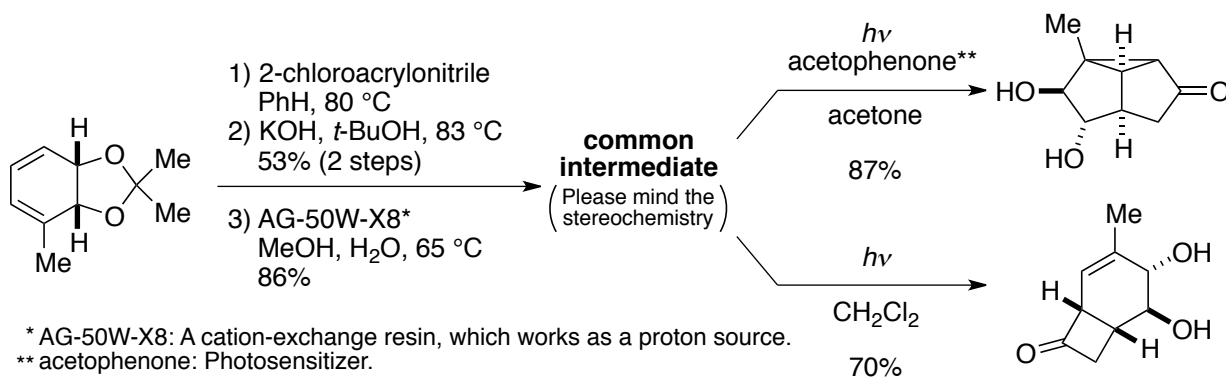
problem 09/28/2019 Q4  
 C. Fehr and J. Galindo, *Angew. Chem. Int. Ed.*, **45**, 2901 (2006)

5.



S. Perrio *et al.*, *Adv. Synth. Catal.*, **360**, 2696 (2018)

6.



\* AG-50W-X8: A cation-exchange resin, which works as a proton source.  
 \*\* acetophenone: Photosensitizer.

M. G. Banwell *et al.*, *Chem. Asian J.*, **12**, 1480 (2017)  
 M. G. Banwell *et al.*, *J. Org. Chem.*, **82**, 8008 (2017)