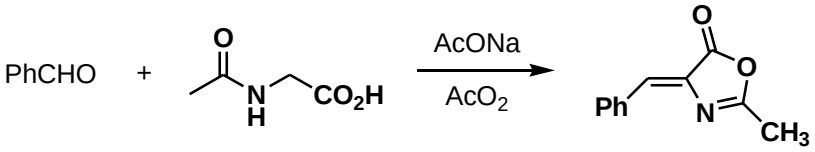
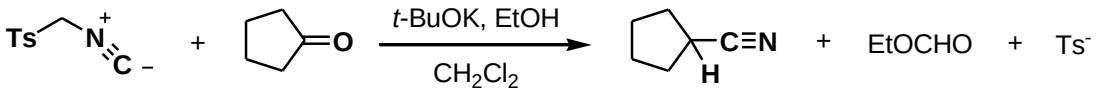
**Problem Set 5:** This problem set is now available at (www.blackboard.utdl.edu). It will be due in class 14 days (05/02/17) from today (04/18/17). Grades will be administered as follows: 10 (exceptional effort), 8 (complete), 5 (incomplete or inadequate effort), 2 (poor effort), 0 (nonexistent). ***No late problem sets will be accepted.***

**1. Problem:** Draw the mechanism for the following.




**2. Problem:** Draw the mechanism for the following. This is a difficult problem. **Tip:** No reaction between *p*-toluenesulfonylmethyl isocyanide (TosMIC) and cyclopentanone occurs until base is added to the reaction mixture. Draw a deprotonation and then the first bond-forming step, and *then* number the atoms.




**3. Problem:** The Mitsunobu Reaction is used quite extensively in organic chemistry. It involves a secondary alcohol and carboxylic acid to give a clean inversion giving rise to an ester. The reaction requires $Ph_3P$ and $EtO_2CN{=}NCO_2Et$ (diethyl azodicarboxylate, DEAD). Provide the mechanism for the following transformation.