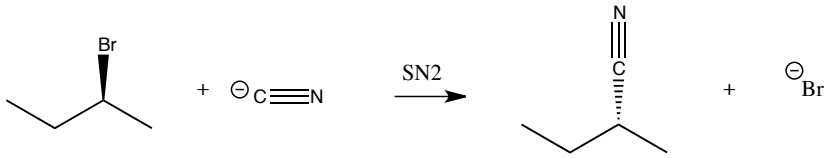
Exam 2: What would have been…

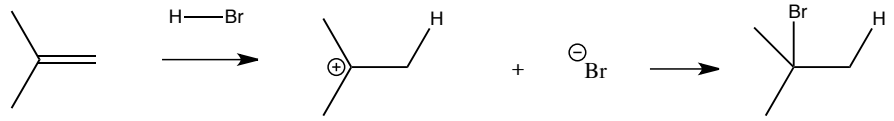
The following is a take home practice exam. When you are ready, set a timer for 1 hour and 15 minutes. You can check you answers against the answer key. Answers will be ranked as easy (*), medium (**), and hard (***). Have fun!

1. Show the curved arrows illustrating the following reactions. Make sure to show all bond breaking and bond forming events (10 points).*

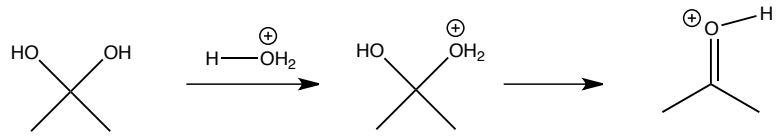
a.



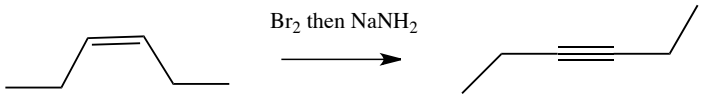
b.

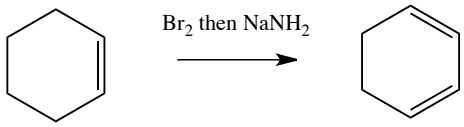


c.

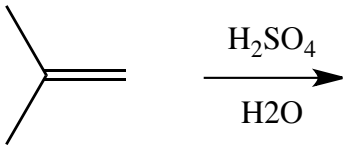


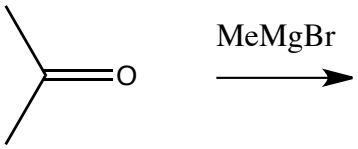
2. When 3-hexene is treated to Br_2 followed by $NaNH_2$, an alkene is formed. However, when cyclohexene is treated to the same conditions, a cyclohexadiene is formed. Explain this difference? (9 points)**

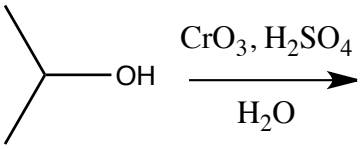


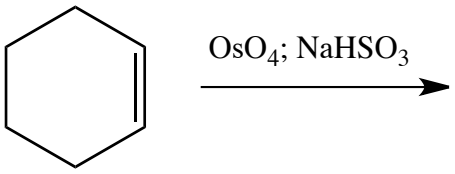


3. Show the products or reagents for the following reactions. Make sure to address stereochemistry when appropriate. (4 points each, 24 points). **

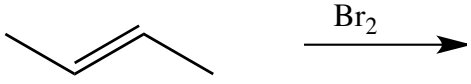
a. 

b. 

c. 

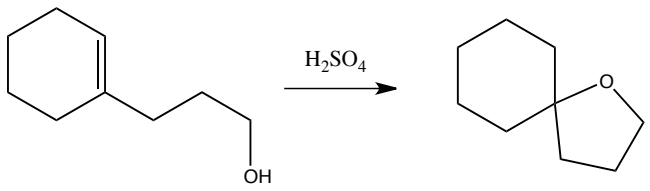
d. 

e. 

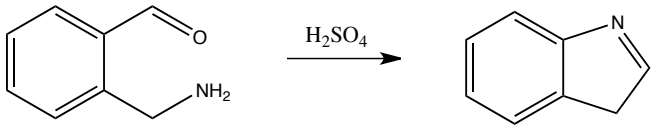
f. 

4. Show the mechanisms of the following reactions, using curved arrows to illustrate your reactions. (16 points, 8 points each)**

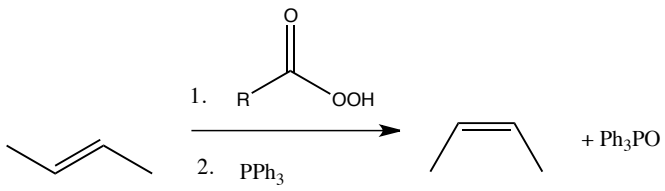
a.



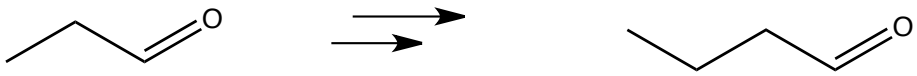
b.

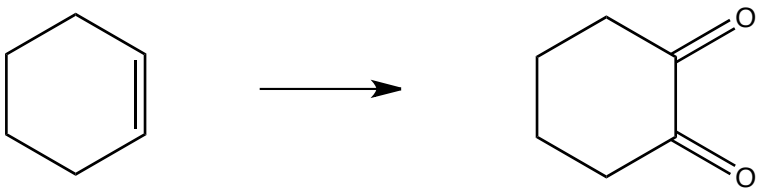


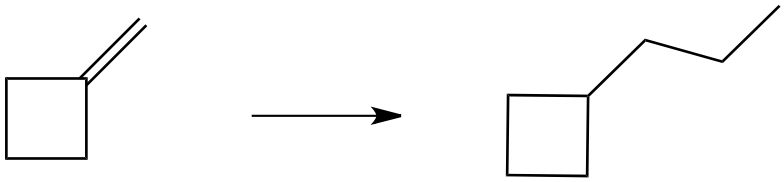
5. A *trans* double bond can be converted to a *cis* double bond by treatment of a peroxyacid followed by treatment with triphenylphosphine. Explain the stereochemical outcome of this process, using mechanisms throughout the second step (10 points)***



6. The following syntheses can be carried out in 3 or fewer steps. Show a synthesis. (If you use more then 3 steps, it is ok). (7 points each, 21 points)**

a. 

b. 

c. 

7. Show a synthesis of hexane using methanol (H_3COH) as your only carbon-based starting materials. (10 points)***