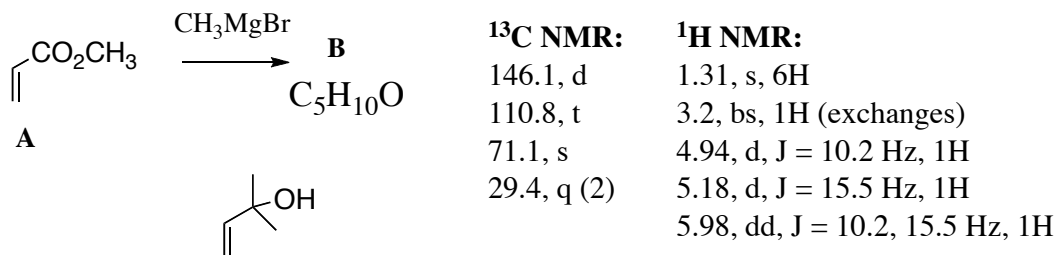
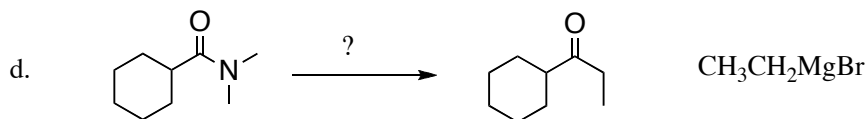
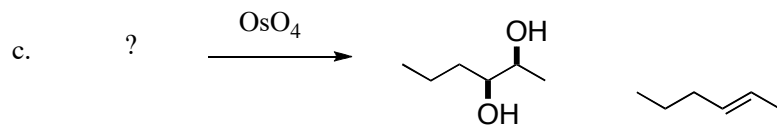
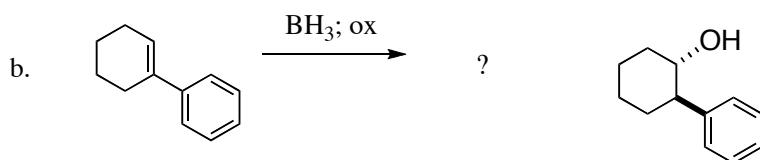
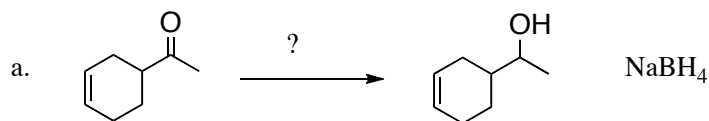


This is an open-book, open notes exam. Please show your work in detail.

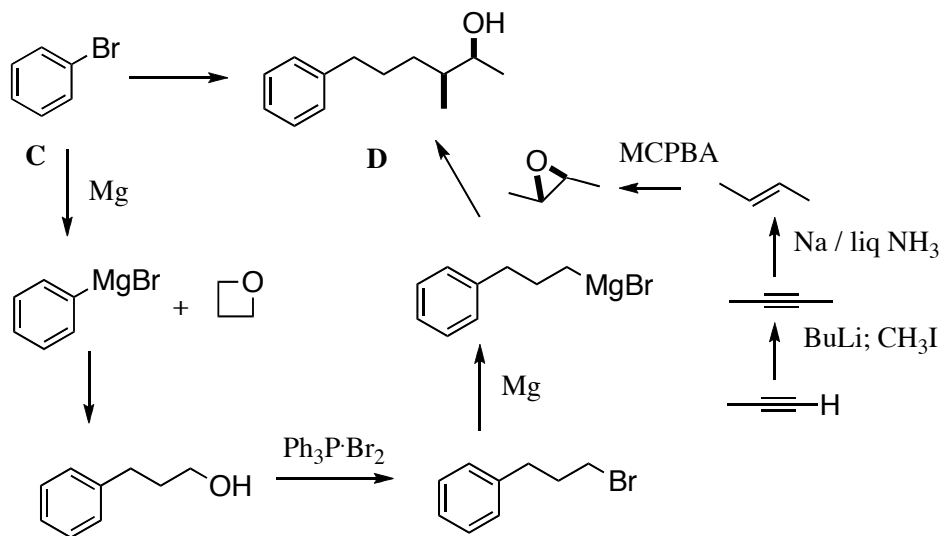
1. (20 points) Deduce the structure of **B**, and fill in the missing reagent(s). You do not need to show mechanisms.



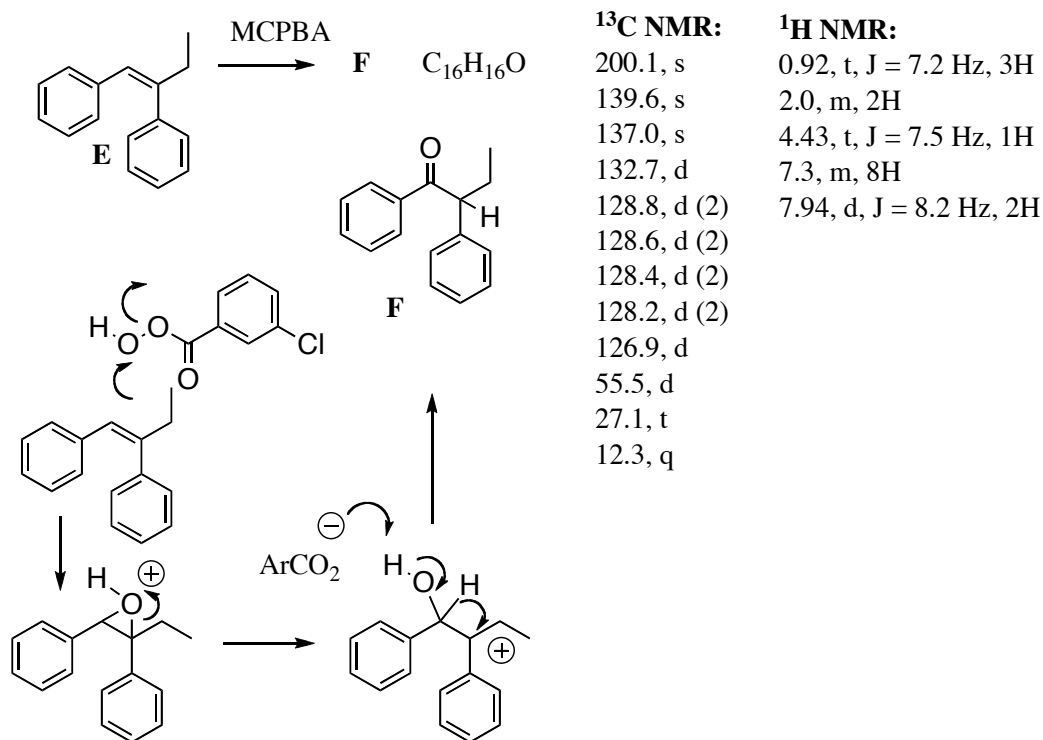
2. (20 points) Fill in the missing starting material, reagent or product. Please show stereochemistry clearly.



3. (20 points) Outline a synthesis of **D** from **C**. You may use any piece that contributes three or fewer carbons to the final product. Absolute configuration is not important, but relative configuration is.



4. (20 points) Deduce the structure of **F**, and draw an arrow-pushing mechanism for the transformation.



5. (20 points) Draw detailed arrow-pushing mechanisms for the transformation of **G** to **H**, and **H** to **I**. For 3 points each, correctly label **H** and **I**.

