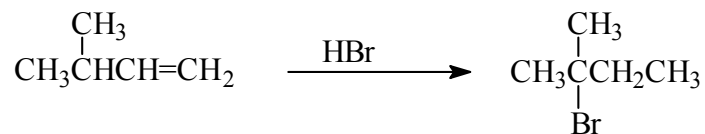
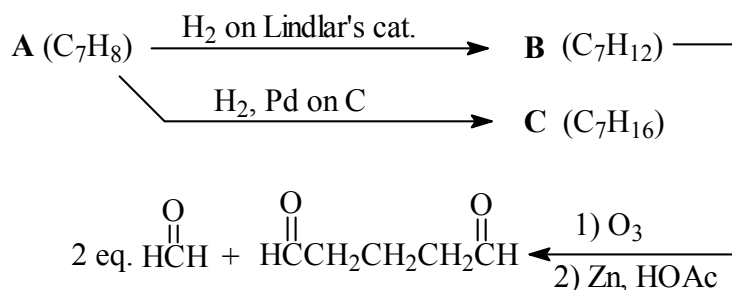


1.(8) Give the stepwise mechanism for the following reaction. Use arrows to indicate the electron flow and show any intermediates.

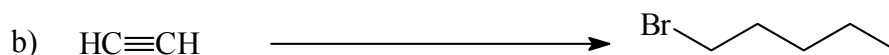
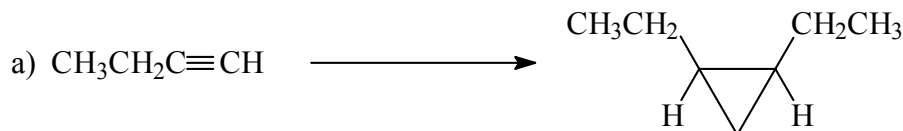


2.(14) An unknown compound (**A**) has a formula of C_7H_8 . Treatment of **A** with H_2 on Lindlar's catalyst gives compound **B** (C_7H_{12}). Treatment of **A** with H_2/Pd on carbon (standard hydrogenation) gives compound **C** (C_7H_{16}). Ozonolysis of **B** followed by a Zn/acetic work-up gives pentanedial and 2 equivalents of formaldehyde.

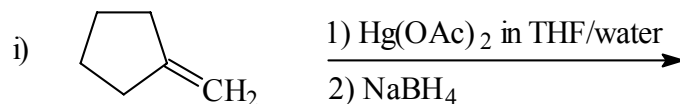
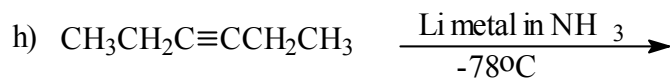
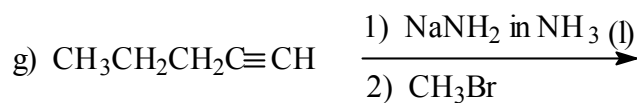
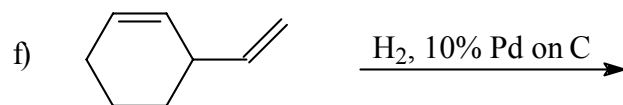
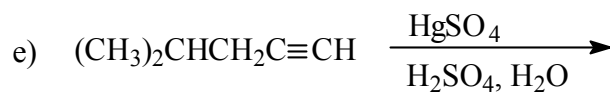
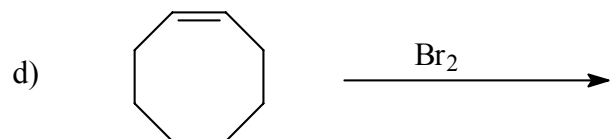
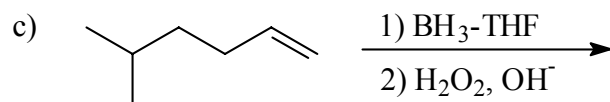
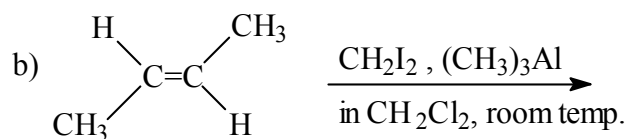


Propose structures for **A**, **B**, and **C** that are consistent with these data.

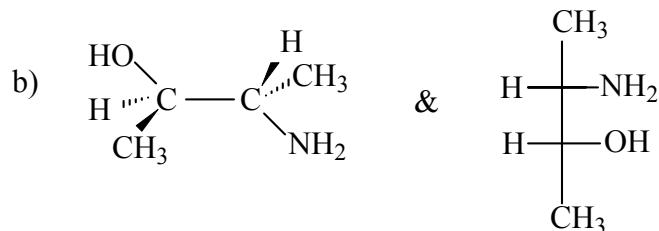
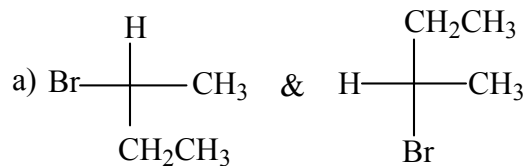
3.(14) Propose a sequence of steps that will allow for the transformations.



4.(36) Draw the major organic structure for the following reactions:

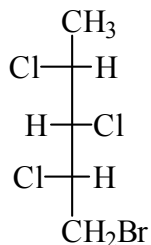


5.(12) Determine whether the following pairs of compounds are **identical**, **enantiomers** or **diastereomers**. Also, give the absolute configuration (**R** or **S**) for each chiral center.



6.(12) Compound **A** shown below has a specific rotation of -44° .

a) Identify the absolute configuration (R/S) for each chiral center in **A**.



A

b) Above, draw a Fischer projection of the enantiomer of compound **A**. What is its specific rotation? _____

c) How many total stereoisomers are there of compound **A**? _____

d) Draw two pairs of enantiomers (4 structures) that are stereoisomers of **A**.

Are there any meso compounds? _____ If so, draw one.