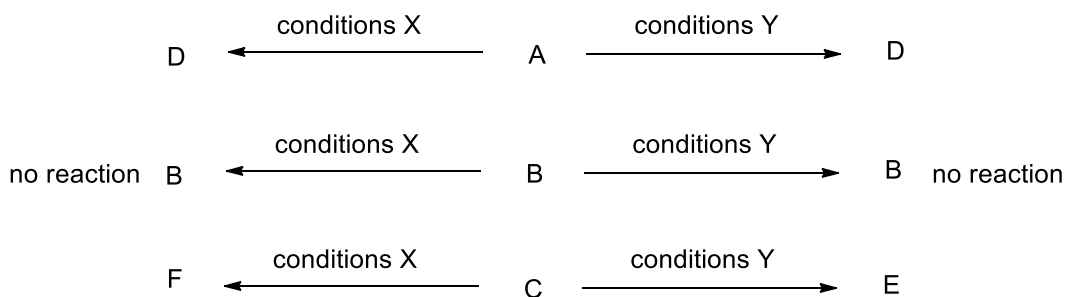


**WORKSHOP, Chapter 15**  
*Alcohol Reactions and Syntheses*

1. Compounds A, B, and C all have the molecular formula  $C_5H_{12}O$ . All three compounds were treated independently to two oxidation reactions (conditions X and Y).

These were the results of the reactions.

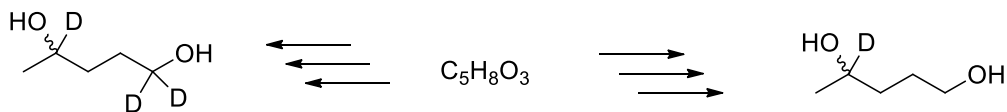


Compound E has the  $^1H$  NMR structure of

11.2 ppm (s, 1H) : 2.3 ppm (d, 2H) : 2.0 (t of sept, 1H) : 1.0 (d, 6H)

Draw all the possible structures of compounds A, B, C, D, E and F. What are conditions X and Y?

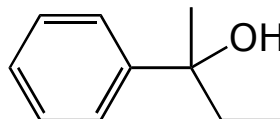
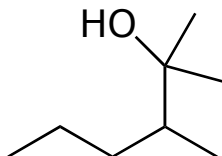
2. Design a racemic synthesis of 1,1,4-trideuteriopentane-1,4-diol and 4-deuteriopentane-1,4-diol starting from



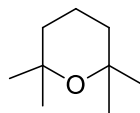
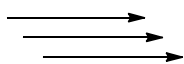
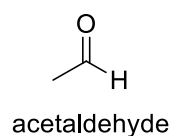
1,1,4-trideuteriopentane-1,4-diol

4-deuteriopentane-1,4-diol

3. Show how to prepare each of the two compounds below using Grignard coupling reactions for the C-C bond-forming steps. All the carbons in the products must originate from benzene or alcohols having three or fewer carbon atoms. You may use any needed reagents or solvents.



4. Design a synthesis of 2,2,6,6-tetramethyltetrahydro-2H-pyran starting from acetaldehyde. You can use any reagents needed.



2,2,6,6-tetramethyltetrahydro-2H-pyran