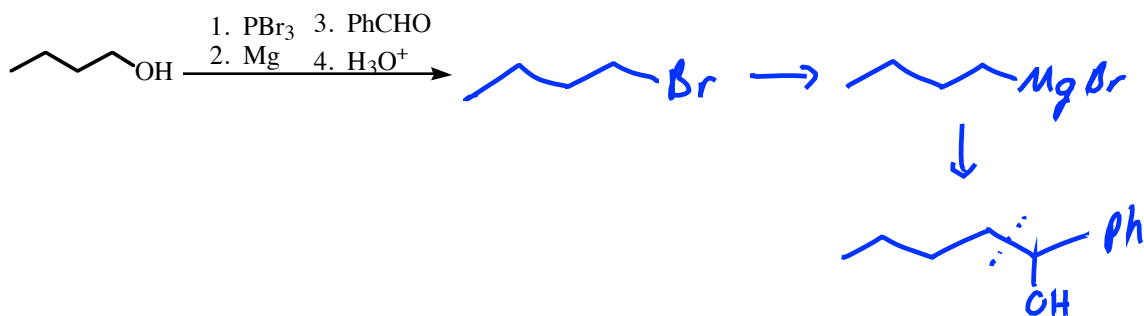
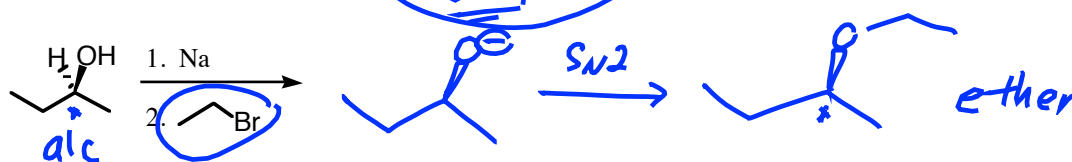
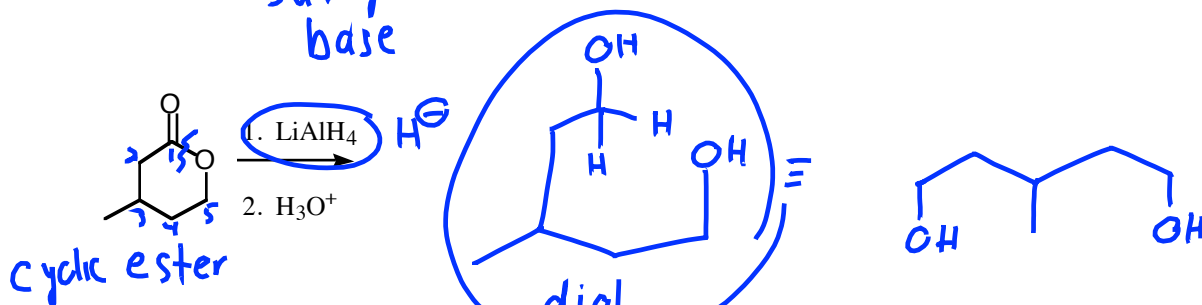
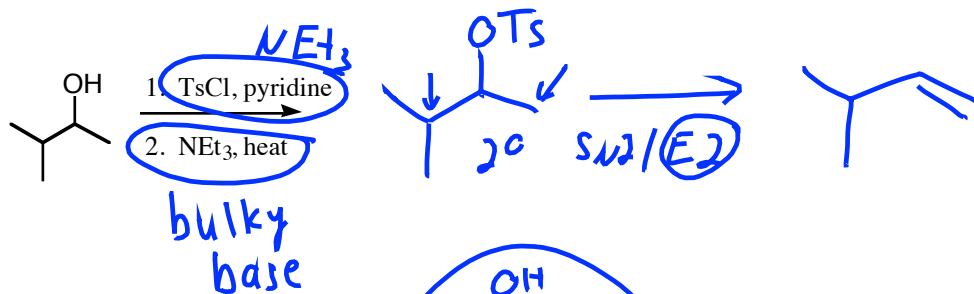
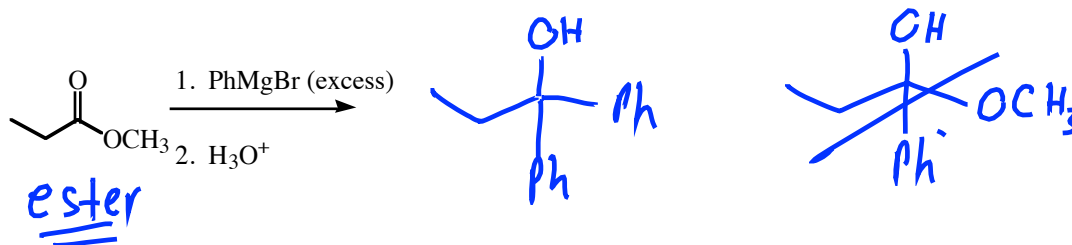
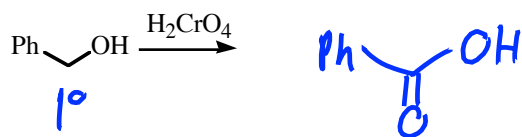
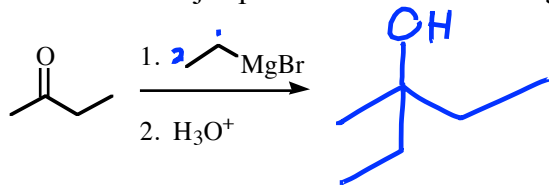


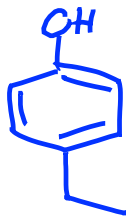
1. Give the major product for the following reactions. (3 points each)



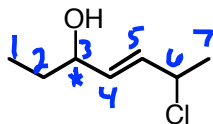
**M**  
**R**  
**T**

2. Give Names or structures for the following: (9 points)

para-ethylphenol

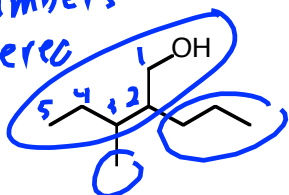


- ① main core  
② subst  
③ numbers  
④ stereo



(E)-6-chlorohept-4-en-3-ol

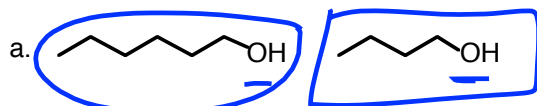
trans-



3-methyl-2-propyl-1-pentanol

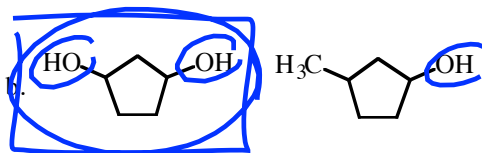
3-methyl-3-propylpentan-1-ol

3. For each of the following pairs, circle the one that is higher boiling and put a square around the one with the higher water solubility. (4 points)



more C  $\uparrow$  bp  
 $\downarrow$  H<sub>2</sub>O sol

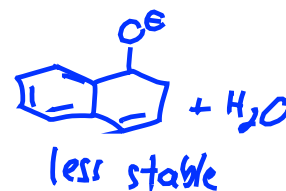
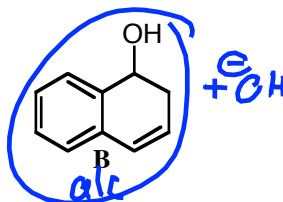
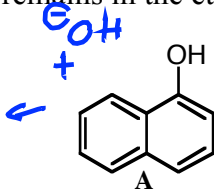
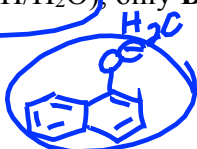
H-bonding



4. Which of the following statements is true? (4 points)

- a. When an ether solution of **A** and **B** in a separatory funnel is treated with neutral water, only **B** remains in the ether layer.  $\times$  A+B
- b. When an ether solution of **A** and **B** in a separatory funnel is treated with neutral water, neither **A** nor **B** remains in the ether layer.  $\times$  both A+B
- c. When an ether solution of **A** and **B** in a separatory funnel is treated with basic water (NaOH/H<sub>2</sub>O), both **A** and **B** remain in the ether layer.
- d. When an ether solution of **A** and **B** in a separatory funnel is treated with basic water (NaOH/H<sub>2</sub>O), only **B** remains in the ether layer.

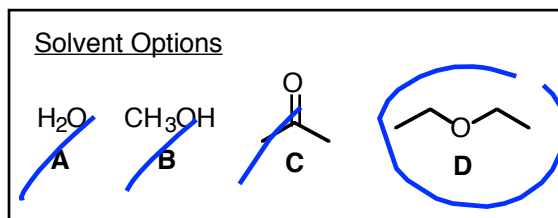
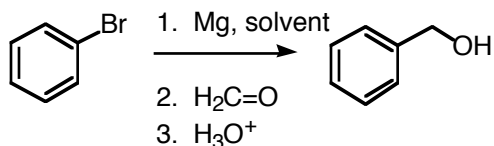
neutral-ether  
ionized-water  
Neutral: both neutral res



5. For the following transformation, which of the following statements is true? (4 points)

- a. **D** is the only acceptable solvent
- b. **C** is the only acceptable solvent
- c. **C** and **D** are both acceptable solvents
- d. **B**, **C**, and **D** are all acceptable solvents
- e. **A** and **B** are the only acceptable solvents

- ① OH  
② C=O

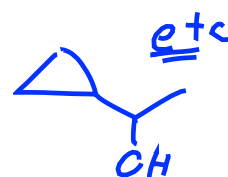
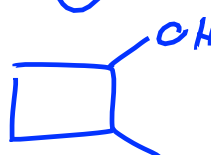
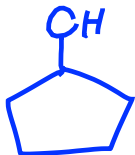


OH C=O

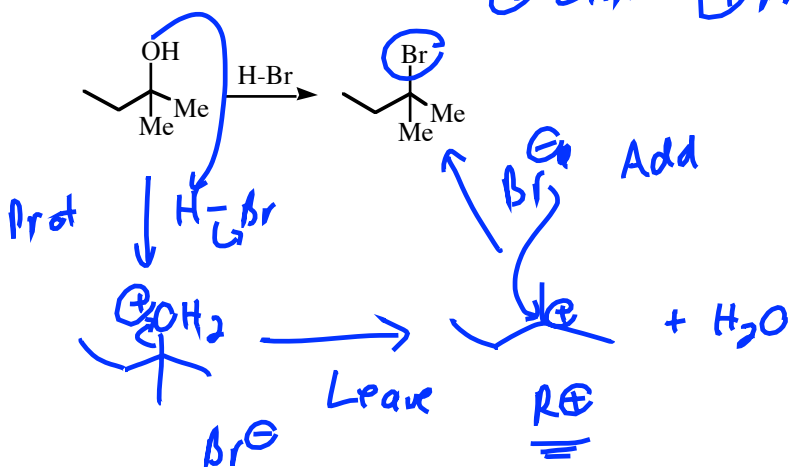
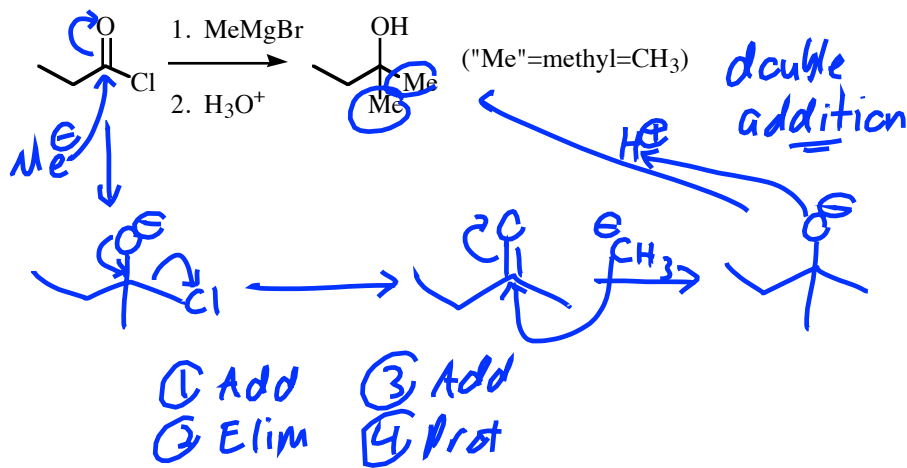
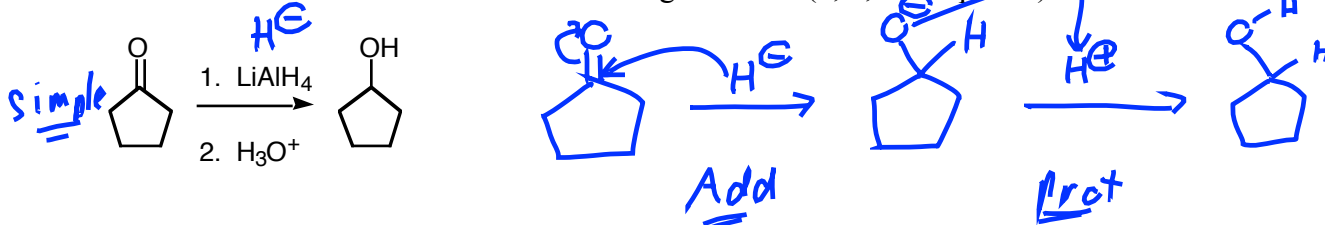
6. Suggest a possible structure for an unknown **A** whose formula is  $C_5H_{10}O$  and gives the following chemical test results. (5 points)

Formula	$C_5H_{10}O$	$EU = 1$	$12 - 10 = 2H \div 2 = 1 EU$
Hydrogenation Test	$H_2/Pt$	No reaction	
Chromic Acid Test	$H_2CrO_4$	Turns Green	$1^\circ$ or $2^\circ$
Lucas Test	$HCl/ZnCl_2$	Reacts within 5 minutes	$2^\circ$ or $3^\circ$

$2^\circ$  alc  
1 ring  
1 EU  
not  $C=C$   
 $C=O$



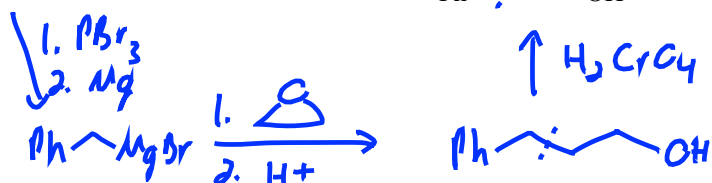
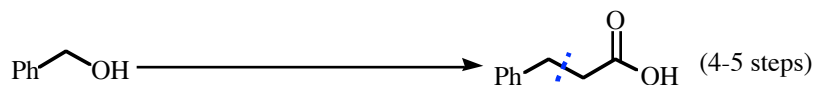
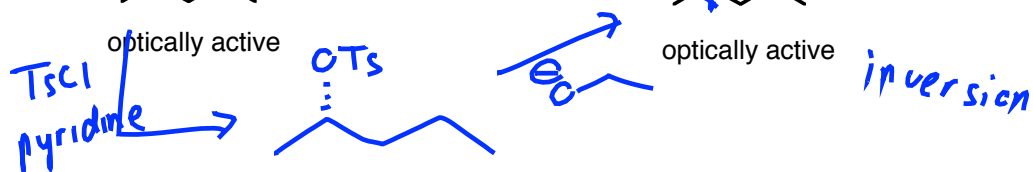
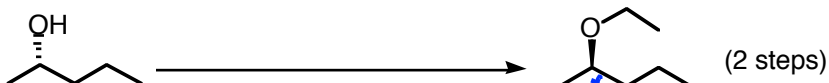
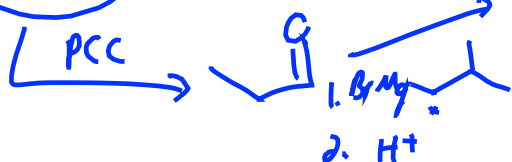
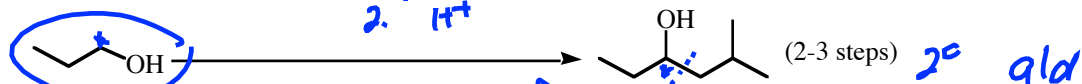
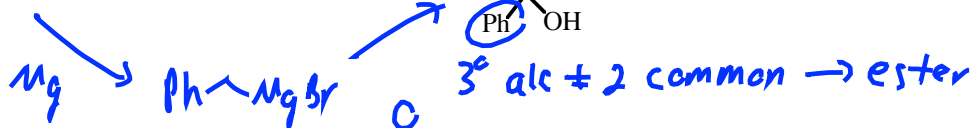
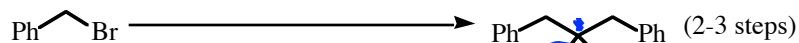
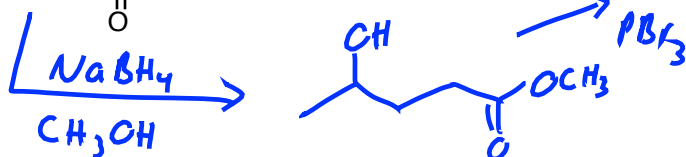
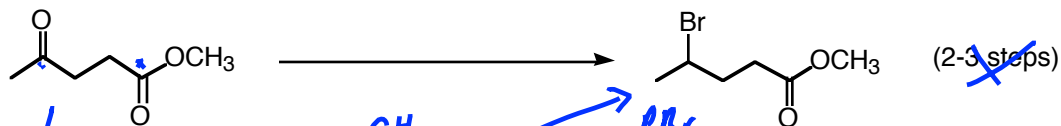
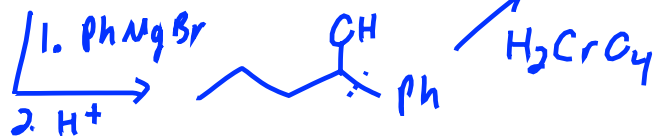
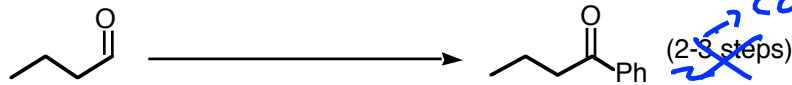
7. Provide the mechanisms for the following reactions (3, 5, and 5 points)



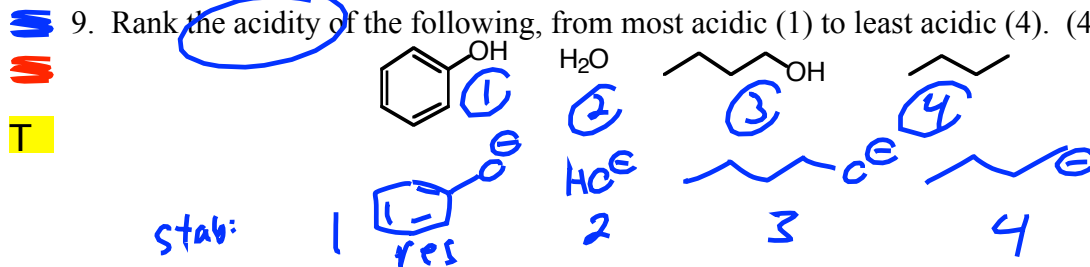
- ① Draw all intermediates
- ② Draw all formal charges
- ③ Draw all arrows
- ④ No backwards arrows

8. Provide the reagents necessary to accomplish the following transformations (4 points each)

T



9. Rank the acidity of the following, from most acidic (1) to least acidic (4). (4 points)



10. Design syntheses of the following. (6 points each). Allowed starting materials (same as practice) include:

cyclopentanol      any esters      ethylene oxide      formaldehyde      iodomethane  
 any acyclic alcohol or alkene with  $\leq 4$  carbons  
 any "inorganic" agents (things that won't contribute carbons to your skeleton)

