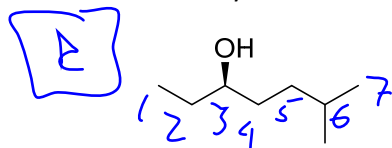


Name: \_\_\_\_\_

Select the correct solution for each multiple-choice question. (2 points each)

1. Identify the correct IUPAC name for the following structure.



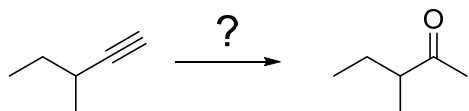
a. (R)-2-methyl-5-heptanol

c. (R)-6-methyl-3-heptanol

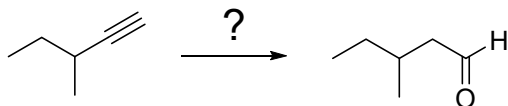
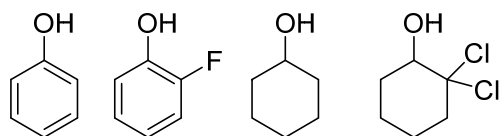
b. (S)-1-ethyl-4-methylpentanol

d. (S)-2-methyl-5-heptanol

2. Circle the reagents required for the given reaction.

a. 1. 9-BBN  
2. H<sub>2</sub>O<sub>2</sub>, NaOHc. 1. O<sub>3</sub>  
2. H<sub>2</sub>Ob. dilute H<sub>2</sub>SO<sub>4</sub>d. HgSO<sub>4</sub>, H<sub>2</sub>SO<sub>4</sub>  
H<sub>2</sub>O

3. Circle the reagents required for the given reaction.

a. 1. 9-BBN  
2. H<sub>2</sub>O<sub>2</sub>, NaOHc. 1. O<sub>3</sub>  
2. H<sub>2</sub>Ob. dilute H<sub>2</sub>SO<sub>4</sub>d. HgSO<sub>4</sub>, H<sub>2</sub>SO<sub>4</sub>  
H<sub>2</sub>O4. Rank the following acids from **most acidic to least acidic**.

I II III IV  
 (2) (1) (4) (3)

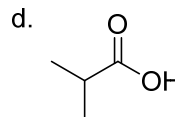
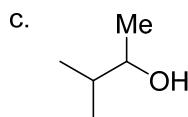
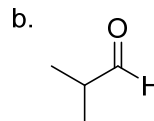
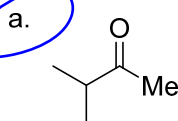
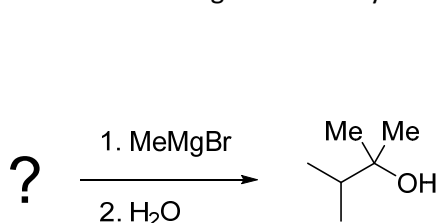
a. I&gt;II&gt;III&gt;IV

c. II&gt;I&gt;IV&gt;III

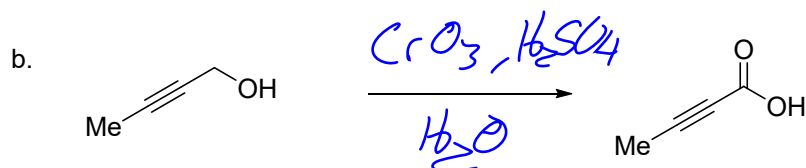
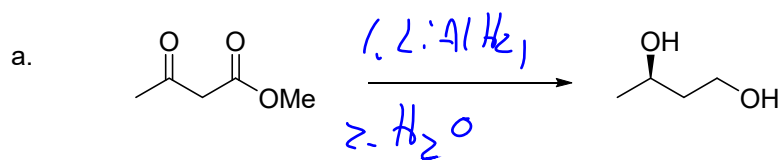
b. II&gt;III&gt;I&gt;IV

d. III&gt;IV&gt;I&gt;II

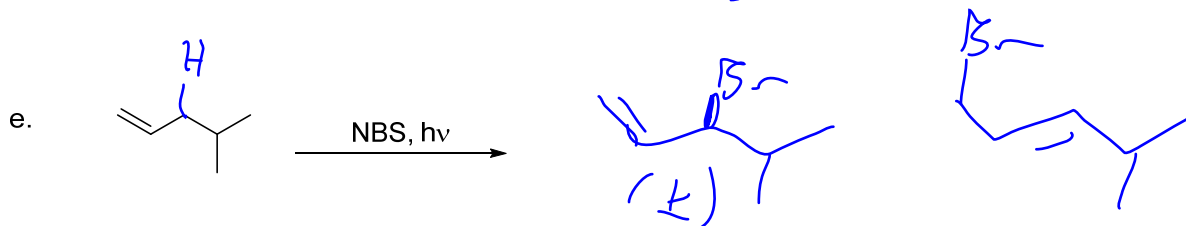
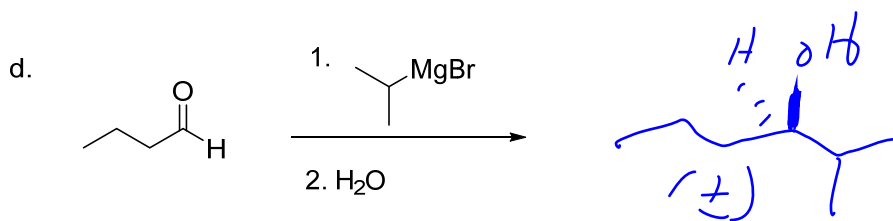
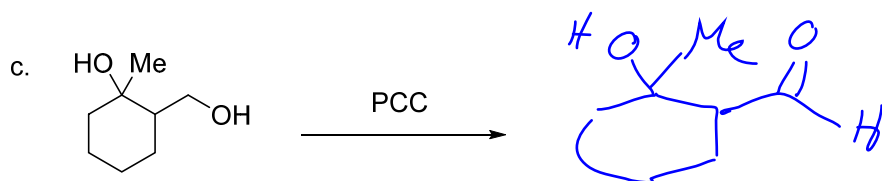
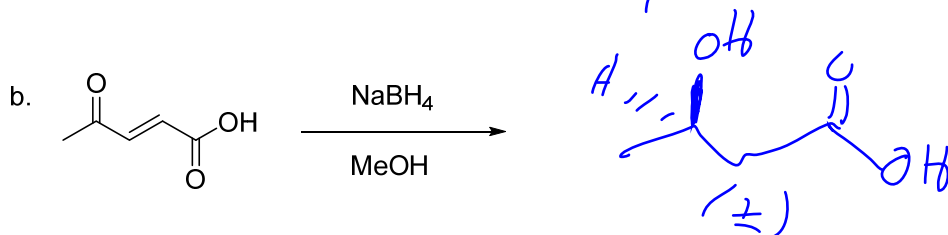
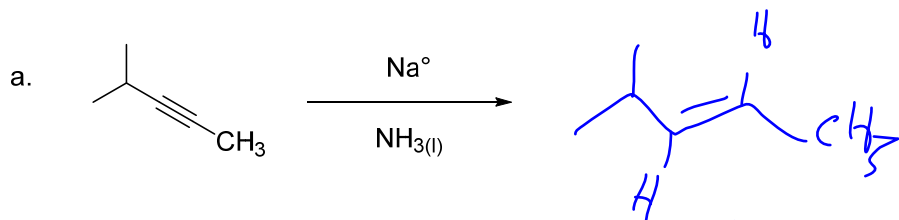
5. Circle the starting material to yield the following alcohol in the reaction below.



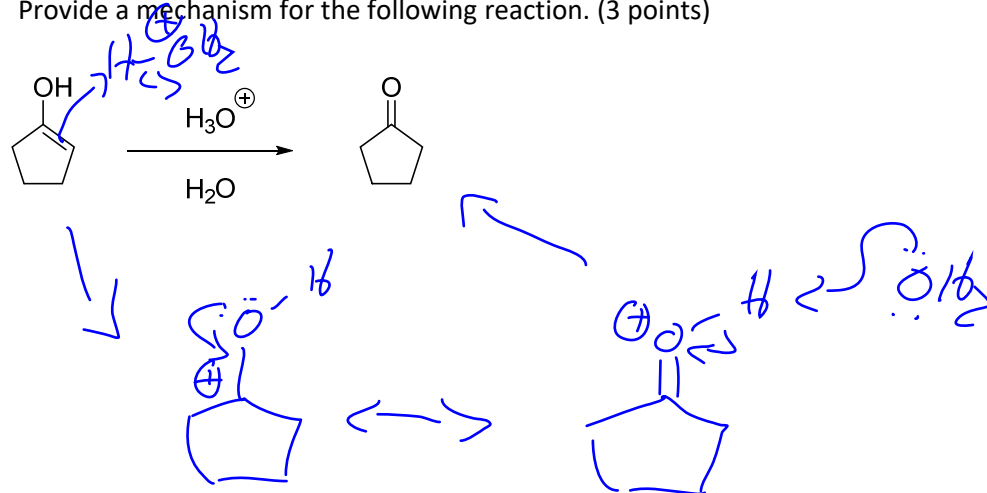
6. Provide the necessary reagents for the following reactions. You do not need to draw mechanisms for these problems. (4 points)



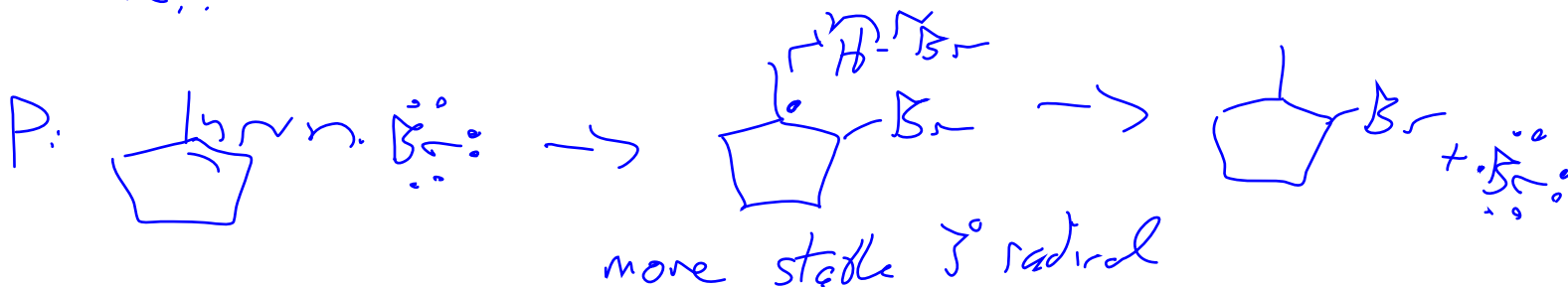
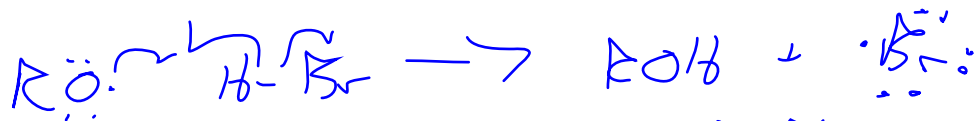
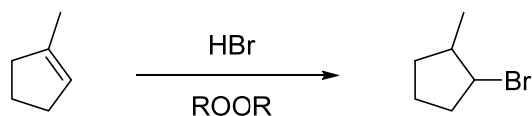
7. Provide the product for the following reactions. Be sure to clearly indicate stereochemistry where appropriate. You do not need to draw mechanisms for these problems. (10 points)



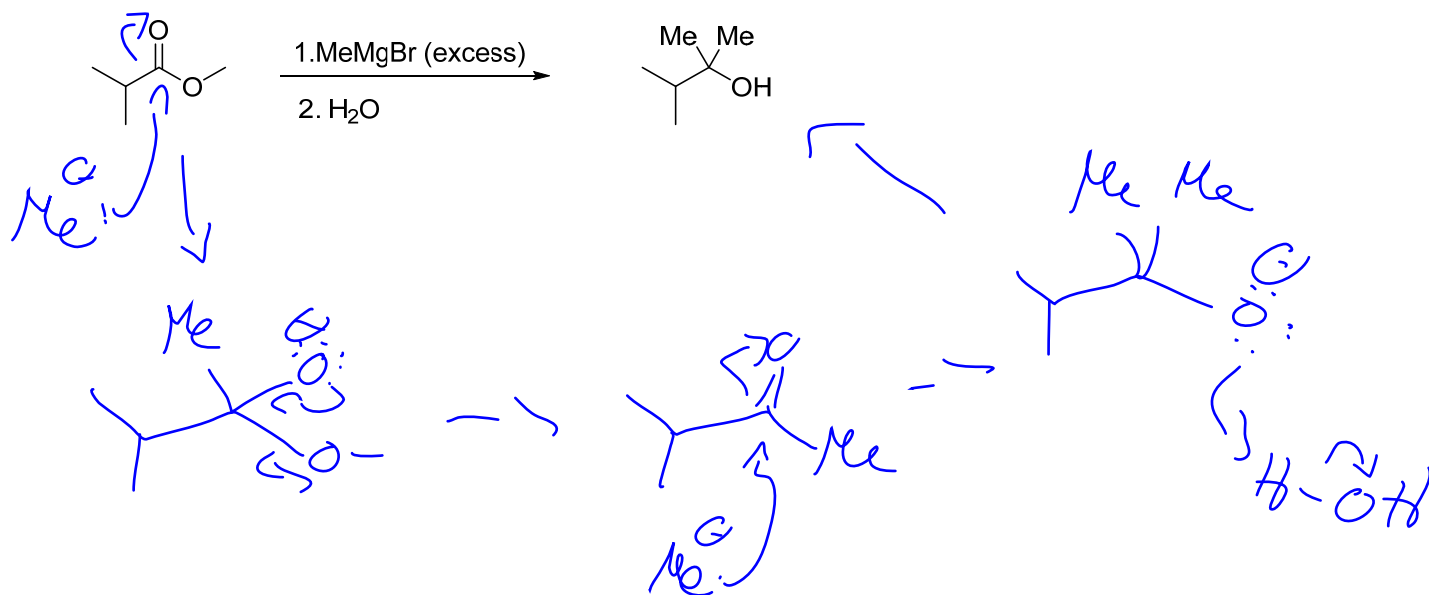
8. Provide a mechanism for the following reaction. (3 points)



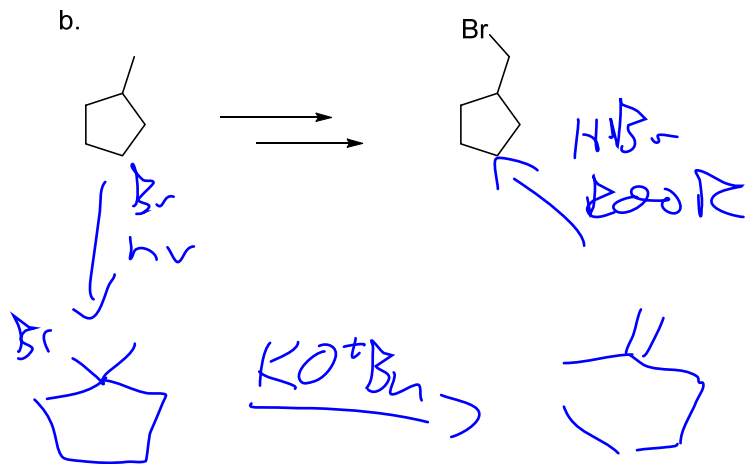
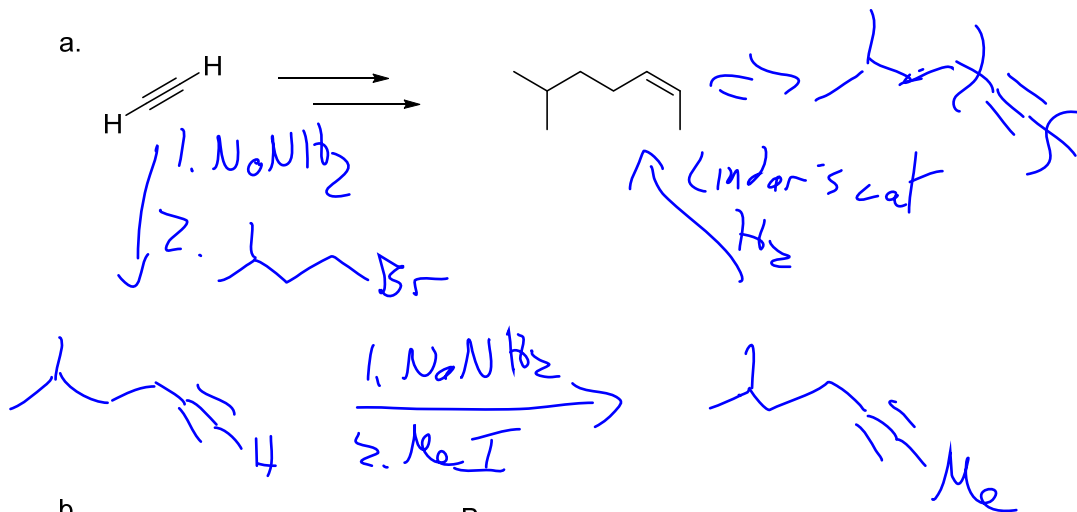
9. a. Provide a mechanism for the following reaction.  
 b. Label each step as initiation (I), propagation (P) or termination (T).  
 c. Explain the observed **regioselectivity** for the brominated product.  
 (6 points)



10. Provide a mechanism for the following reaction. (6 points)



11. Propose a synthesis for the following transformations. (8 points)



12. Use the spectra and molecular formula below to determine the structure of the unknown compound. For the  $^1\text{H}$  NMR, label multiplicities on the spectrum and each set of protons on your proposed structure (a,b,c,...). For the IR, provide assignments for the indicated signals. (8 points)

