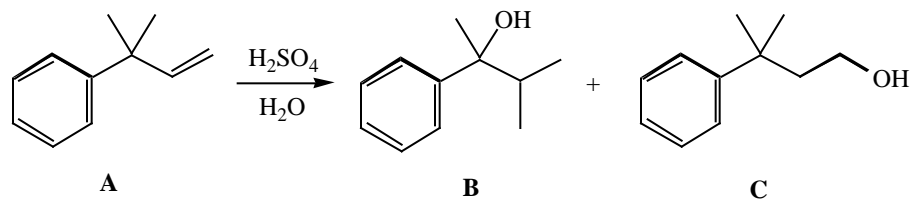


1. Consider this reaction:



(a) (1 point): Circle the major product: **A** **B** **C**

(b) (9 points) Write a mechanism for the formation of the major product. Label the rate-determining step as *rds*.

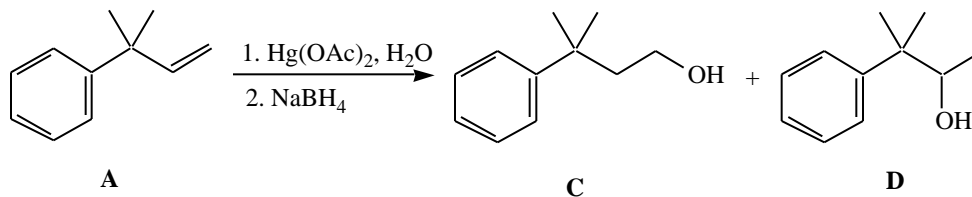
(c) (8 points) Briefly explain your choice of major product.

(d) (6 points) This is an example of an electrophilic addition reaction. Very briefly explain why this is an addition reaction, and identify the electrophile.

Addition:

Write the structure of the electrophile that adds to the alkene:

2. Consider this reaction:



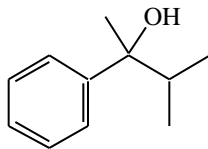
(a) (1 point) Besides electrophilic addition and hydration, the best name for this reaction is \_\_\_\_\_.

(b) (1 point) Circle the major product: **A**   **C**   **D**

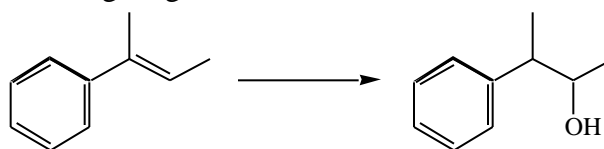
(c) (1 point): Does this reaction obey Markovnikov's Rule (circle one)? Yes   No

(d) (8 points) Provide the mechanism for the reaction of the alkene with Hg(OAc)<sub>2</sub> and H<sub>2</sub>O. Stop the mechanism before NaBH<sub>4</sub> is added.

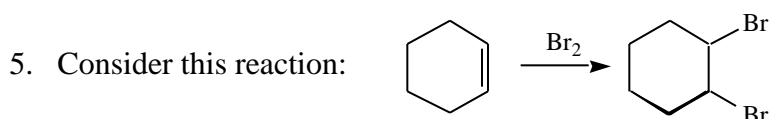
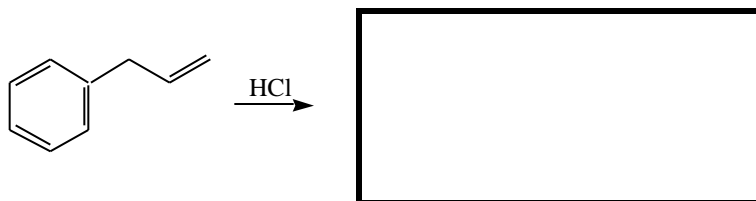
(e) (8 points) Briefly explain why the alcohol shown below is not a possible product of this reaction.



3. (2 points) Write the missing reagents.



4. (7 points) Write the major product in the box. Write the mechanism for its formation.

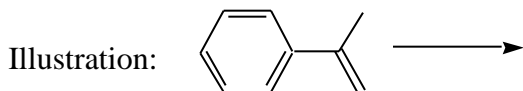


- (a) (1 point) The major product of this reaction is (circle one): syn    anti
- (b) (4 points) Write a mechanism for the formation of the major product.
- (c) (6 points) Briefly explain your choice for the product stereochemistry.

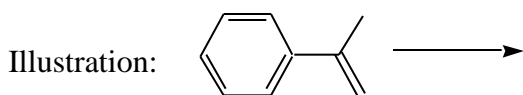
6. (2 points) Draw one molecule that meets all the following requirements: Exactly four carbons, exactly one radical that is more stable than a primary radical, and exactly one lone pair.
7. (3 points) Radicals are (circle one) nucleophilic electrophilic. This is because (complete the sentence).....

8. (9 points) Using the alkene shown and hydroxy radical (HO) as the only reactants in each case, name and illustrate the three radical fates. Use curved arrows and show the products of each radical fate. If the fate can proceed by more than one pathway, write only the most favorable pathway. Hint: Initiation is *not* a radical fate.

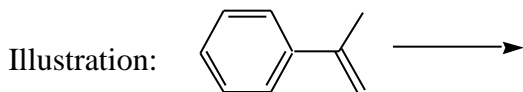
Fate # 1: \_\_\_\_\_



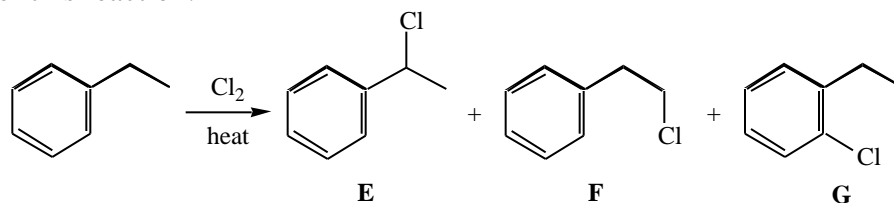
Fate # 2: \_\_\_\_\_



Fate # 3: \_\_\_\_\_



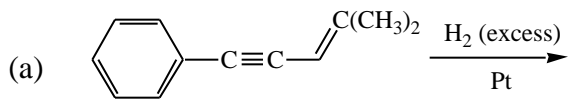
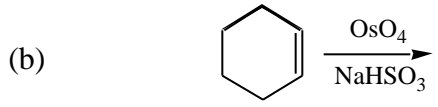
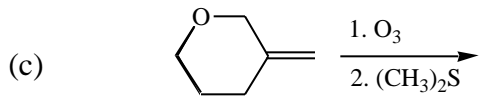
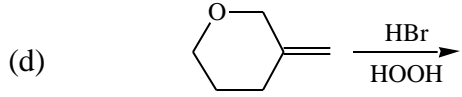
9. Consider this reaction:



- (a) (1 point) Circle the major product: **E** **F** **G**

- (b) (7 points) Write the best mechanism for the formation of this major product.

10. (15 points) Write the organic product(s) in the boxes. Pay careful attention to stereochemistry. If more than one organic product is formed, indicate which product is major. If no reaction occurs, write "NR." Do not include any mechanism details.

	Product(s)
<p>(a) </p>	
<p>(b) </p>	
<p>(c) </p>	
<p>(d) </p>	
<p>(e) <math>(\text{CH}_3)_3\text{CC}\equiv\text{CH} \xrightarrow[\text{H}_2\text{O}]{\text{H}_2\text{SO}_4}</math></p>	