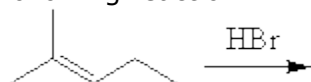


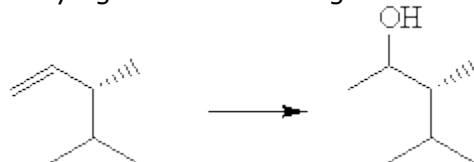
# Vollhardt-Schore, Organic Chemistry 5e Ch 12

1. What product would result from the following reaction?



- A.
- B.
- C.
- D.
- E. These materials should not react.

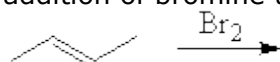
2. Which of the following reaction conditions would be appropriate for carrying out the following transformation?



- A.  $\xrightarrow{\text{H}_2\text{O}, \text{H}_2\text{SO}_4}$
- B.  $\xrightarrow[2. \text{NaBH}_4, \text{NaOH}, \text{H}_2\text{O}]{1. \text{Hg}(\text{OAc})_2}$
- C.  $\xrightarrow[2. \text{H}_2\text{O}_2, \text{NaOH}, \text{H}_2\text{O}]{1. \text{BH}_3, \text{THF}}$
- D. Two of these are correct.

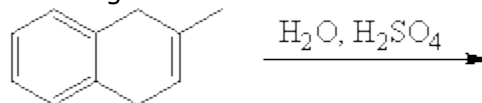
- E. All three of these are correct.

3. What product would result from the addition of bromine to *trans*-2-butene?

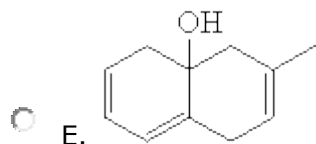


- A.
- B.
- C.
- D. Both B and C would be formed.
- E. All of these would be formed.

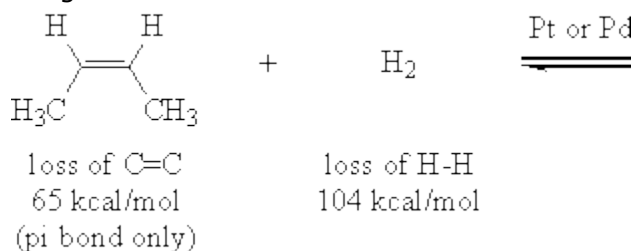
4. Predict the *major* product of the following reaction.



- A.
- B.
- C.
- D.

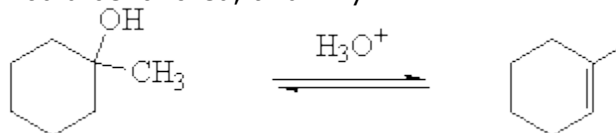


5. Certain transition metals can catalyze both hydrogenation of alkenes and dehydrogenation of alkanes. Consider the following reaction and decide to which side the equilibrium would lie, and why. Note that where bonds are broken or formed, the approximate bond energies are given.



- A. The equilibrium lies to the right.
- B. The equilibrium lies to the left.
- C. The equilibrium lies equally to each side.
- D. There is no way to tell which side will be favored.
- E. This reaction cannot occur.

6. Consider the following equilibrium. With the conditions as indicated, which side would be favored, and why?

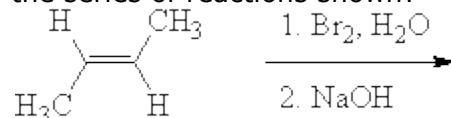


- A. The equilibrium would lie to the right.
- B. The equilibrium would lie to the left.
- C. The equilibrium would lie equally to

both sides.

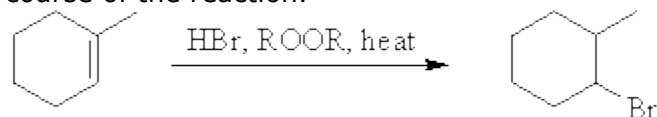
- D. There is no way to tell which side would be favored.
- E. These molecules are not in equilibrium under these conditions.

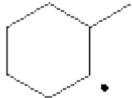
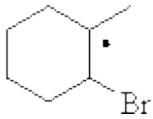
7. What product would you expect from the series of reactions shown?

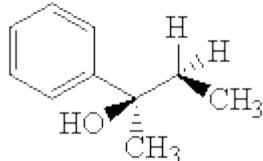
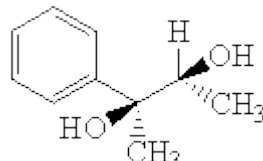


- A.
- B.
- C.
- D.
- E.

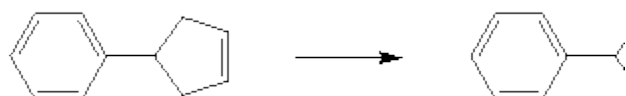
8. Consider carefully the mechanism of the following reaction and determine which one of the following compounds or intermediates is *not* formed during the course of the reaction.



- A. 
- B. 
- C. Br<sup>-</sup>
- D. ROH
- E. RO<sup>•</sup>

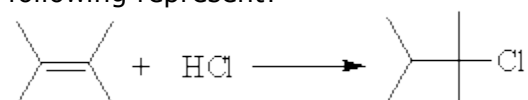
- C. 
- D. 
- E. None of the above.

9. What reagents would be required to accomplish the reaction shown below?



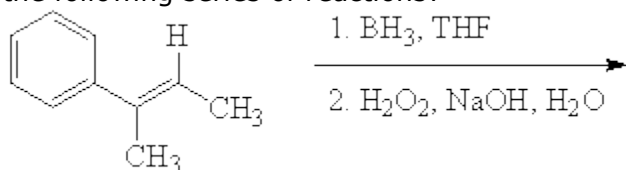
- A. KMnO<sub>4</sub>, H<sub>2</sub>O
- B. CH<sub>3</sub>CO<sub>3</sub>H, then H<sub>3</sub>O<sup>+</sup>
- C. O<sub>3</sub>, then (CH<sub>3</sub>)<sub>2</sub>S
- D. H<sub>2</sub>O<sub>2</sub>, cat. OsO<sub>4</sub>
- E. BH<sub>3</sub>•THF, then H<sub>2</sub>O<sub>2</sub>

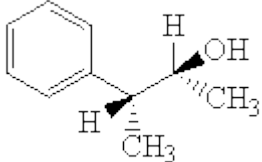
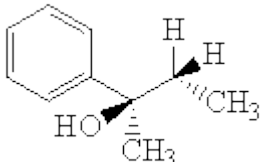
11. What kind of reaction does the following represent?



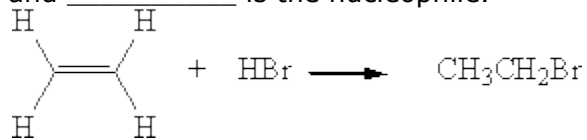
- A. Substitution
- B. Elimination
- C. Addition
- D. Alkylation
- E. Hydration

10. What would you expect to result from the following series of reactions?



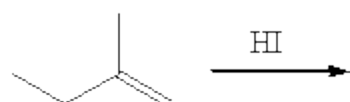
- A. 
- B. 

12. In the first step of the following reaction, \_\_\_\_\_ is the electrophile and \_\_\_\_\_ is the nucleophile.



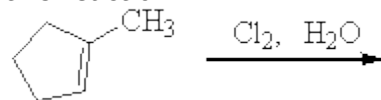
- A. H<sup>+</sup>, Br<sup>-</sup>
- B. H<sup>+</sup>, CH<sub>2</sub>=CH<sub>2</sub>
- C. <sup>+</sup>CH<sub>2</sub>CH<sub>3</sub>, Br<sup>-</sup>
- D. HBr, Br<sup>-</sup>
- E. CH<sub>2</sub>=CH<sub>2</sub>, Br<sup>-</sup>

13. What is the *major* product of this reaction?

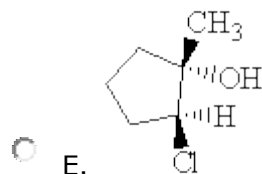


- A. CC(C)(C)C(I)C  
 B. CC(C)C(I)C  
 C. CC(C)(C)C(I)C  
 D. CC=CC + CH3I  
 E. None of the above.

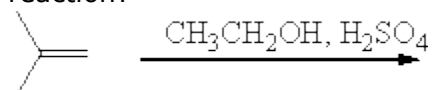
14. What would be the *major* product of this reaction?



- A. CC1(Cl)CCCC1(Cl)  
 B. CC1(Cl)C(O)CCCC1(Cl)  
 C. CC1(Cl)C(Cl)C(O)CCCC1  
 D. CC1(Cl)C(O)C(Cl)CCCC1

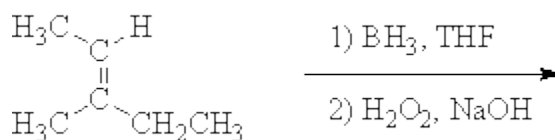


15. What is the major product of this reaction?

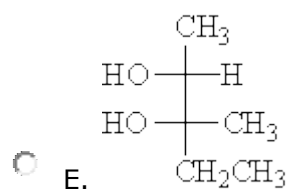
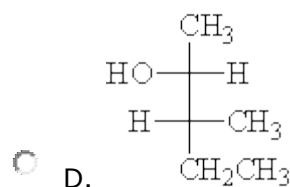
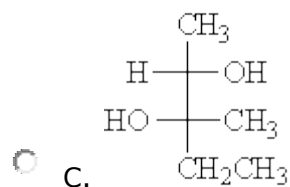


- A. CC(C)(C)OCC  
 B. CC(C)C(OCC)C  
 C. CC(C)(C)S(=O)(=O)O  
 D. CC(C)C(S(=O)(=O)O)C  
 E. CC(C)(C)OS(=O)(=O)O

16. What is the *major* product of this reaction?



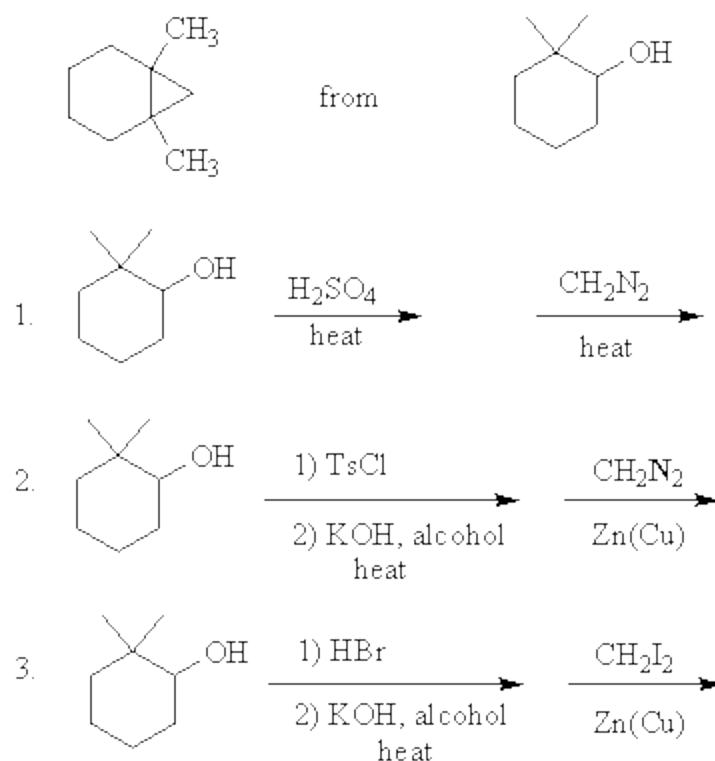
- A. CC(C)(O)CCC  
 B. CC(C)C(O)CC



17. Which set of reagents is used for the purpose of adding water to an alkene in a Markovnikov addition *without* rearrangement?

- A.  $\text{BH}_3$ , THF followed by  $\text{H}_2\text{O}_2$ , NaOH
- B.  $\text{H}_2\text{O}$ ,  $\text{H}_2\text{SO}_4$
- C.  $\text{Br}_2$ ,  $\text{H}_2\text{O}$
- D.  $\text{Hg}(\text{O}_2\text{CCH}_3)_2$ ,  $\text{H}_2\text{O}$  followed by  $\text{NaBH}_4$ , NaOH
- E. None of these

18. Which would be a good laboratory synthesis of the following compound?

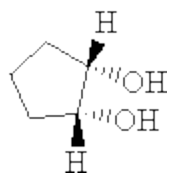


- A. 1 only
- B. 2 only
- C. 3 only
- D. 1 and 2
- E. 1 and 3

19. Which reagent(s) gives some type of cyclopropane ring as a product when reacted with an alkene?

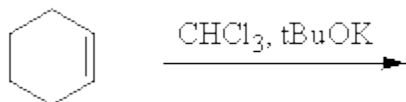
- A.  $\text{CH}_2\text{N}_2$  and heat
- B.  $\text{CH}_2\text{I}_2$  and  $\text{Zn(Cu)}$
- C.  $\text{CHBr}_3$  and  $\text{KOH}$
- D.  $\text{CHCl}_3$  and  $\text{t-BuO}^-$
- E. All of the above

20. Which set of reagents would be best to synthesize the compound shown from cyclopentene?



- A. 1) MCPBA (a peracid), 2) NaOH, H<sub>2</sub>O
- B. 1) Br<sub>2</sub>, 2) 2 eq OH<sup>-</sup>
- C. KMnO<sub>4</sub>, OH<sup>-</sup>, H<sub>2</sub>O
- D. 1) O<sub>3</sub>, CH<sub>3</sub>OH, 2) (CH<sub>3</sub>)<sub>2</sub>S
- E. None of the above

21. What product do you expect to be formed in the reaction shown below?



- A.
- B.
- C.
- D.
- E.