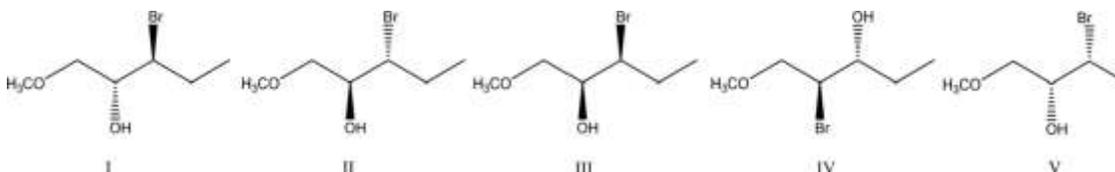
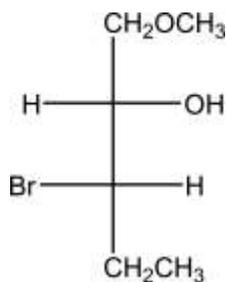


## Practice 2 -Spring 2020

### Multiple Choice

Identify the choice that best completes the statement or answers the question.

- \_\_\_ 1. Which of the following is chiral?
- a sock
  - a spoon
  - an ear
  - a piece of string
  - a car tire
- \_\_\_ 2. Which is the zigzag representation of the following Fischer projection?



- I
- II
- III
- IV
- V

- \_\_\_ 3. Which expression represents the  $K_{\text{eq}}$  for the following reaction?

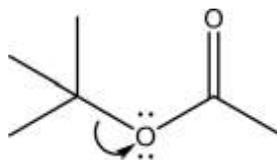


$$\begin{array}{ccccc}
 K_{\text{eq}} = [\text{A}][\text{B}] & K_{\text{eq}} = [\text{C}][\text{D}] & K_{\text{eq}} = \frac{[\text{C}][\text{D}]}{[\text{A}][\text{B}]} & K_{\text{eq}} = \frac{[\text{A}][\text{B}]}{[\text{C}][\text{D}]} & K_{\text{eq}} = \frac{[\text{C}][\text{A}]}{[\text{B}][\text{D}]} \\
 \text{I} & \text{II} & \text{III} & \text{IV} & \text{V}
 \end{array}$$

- I
- II
- III
- IV
- V

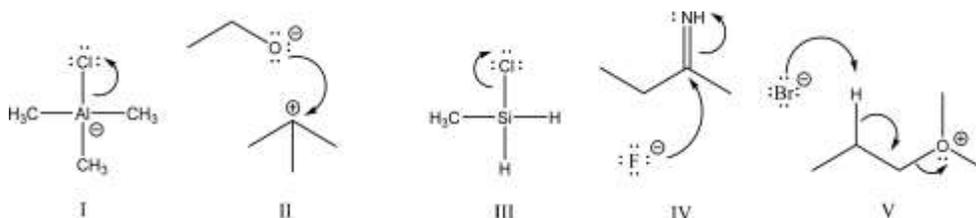


\_\_\_ 8. The following mechanism step is \_\_\_\_\_.



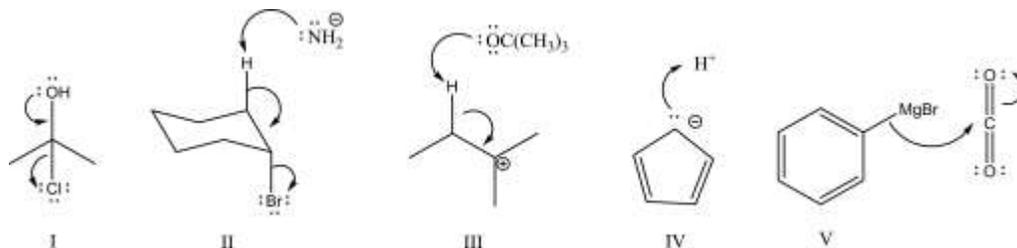
- a. heterolysis
- b. coordination
- c. nucleophile elimination
- d. E2
- e. electrophile elimination

\_\_\_ 9. Which of the following is a coordination step?



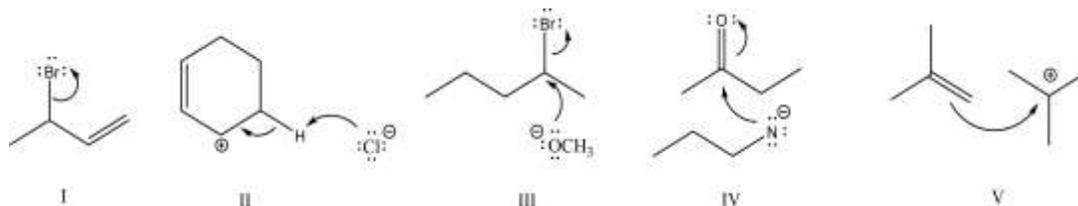
- a. I
- b. II
- c. III
- d. IV
- e. V

\_\_\_ 10. Which of the following is an E2 step?



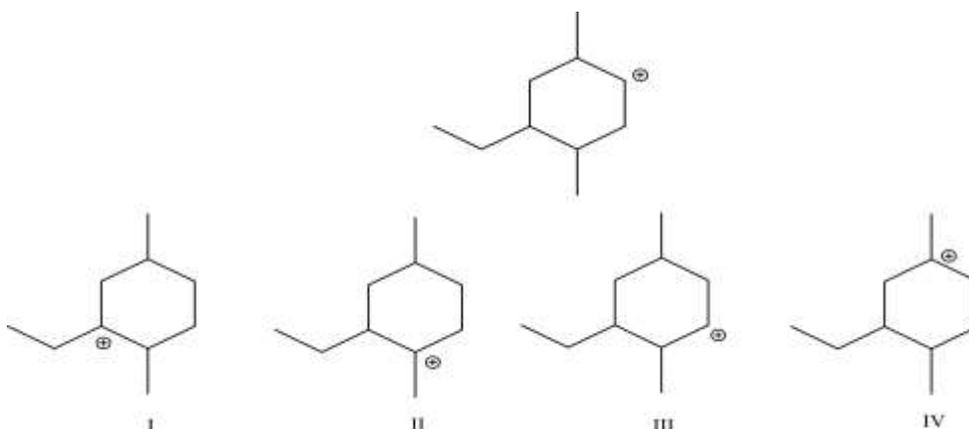
- a. I
- b. II
- c. III
- d. IV
- e. V

\_\_\_ 11. Which of the following is an example of electrophile elimination?



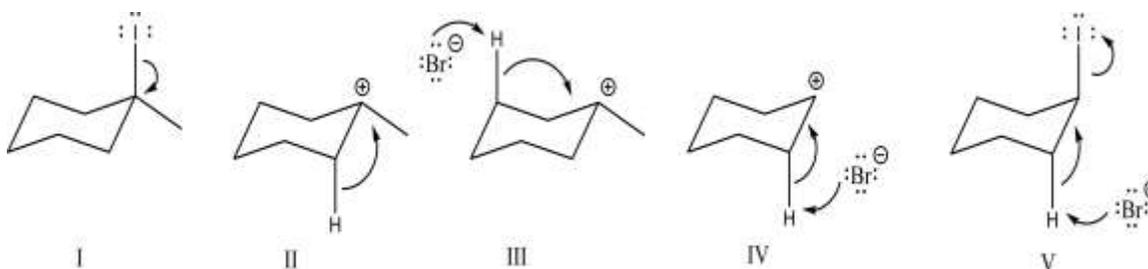
- a. I
- b. II
- c. III
- d. IV
- e. V

\_\_\_ 12. Which of the following is the carbocation most likely formed after a 1,2-hydride shift?



- a. I  
b. II  
c. III  
d. IV  
e. none of these

\_\_\_ 13. Which of the following steps could be found in an E1 mechanism?



- a. I  
b. II  
c. III  
d. IV  
e. V

\_\_\_ 14. Which of the following could be the rate law for an S<sub>N</sub>1 reaction?

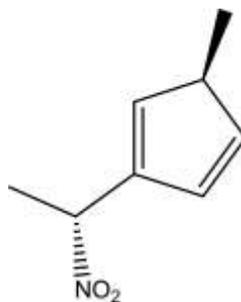
- a. Rate =  $k[A]$   
b. Rate =  $k[A]^2$   
c. Rate =  $k[A][B]$   
d. Rate =  $k[A][B]^2$   
e. Rate =  $k[A]^2[B]^2$

\_\_\_ 15. Which of the following is true of intramolecular proton transfers?

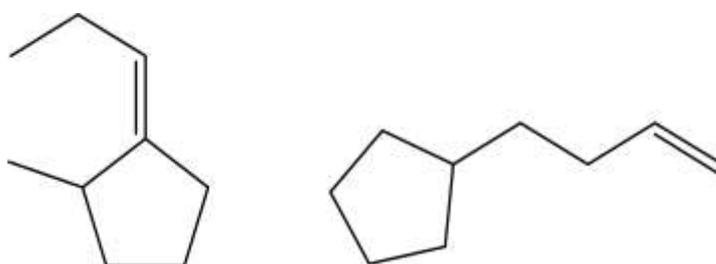
- a. They can occur only in basic conditions.  
b. They can occur only in acidic conditions.  
c. They can occur in both acidic and basic conditions.  
d. They are the most common way in which protons are transferred.  
e. They are not likely to occur.



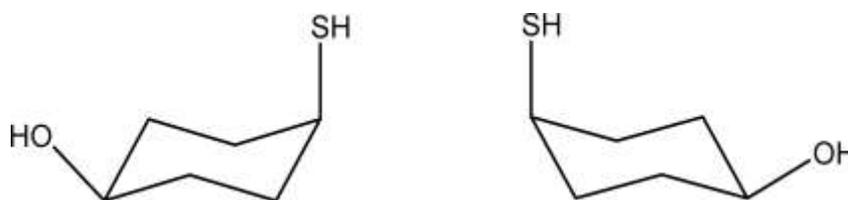
4. What is the maximum possible number of diastereomers for the following molecule?



5. Which of the following alkenes has the lower heat of combustion?



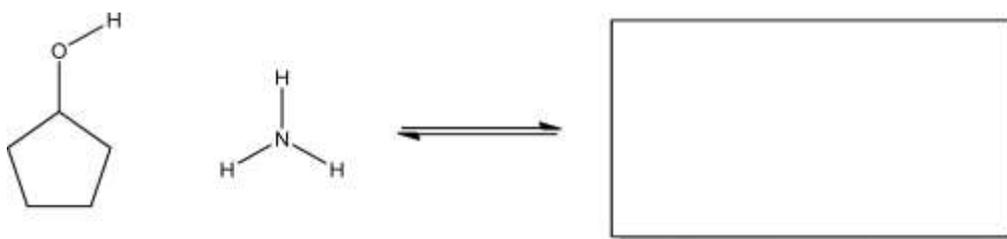
6. Can the following two molecules be separated by fractional distillation? Explain.



7. Consider a mixture that is 80% (+) enantiomer and 20% (-) enantiomer. In which direction will the mixture rotate plane-polarized light? What is the enantiomeric excess (ee) of the mixture?

8. Suppose we dissolve 3 g of a chiral compound in 0.3 L of solution and place it in a tube that is 30.00 cm long. What is the sample's specific rotation if the observed rotation is experimentally determined to be  $4.00^\circ$ ?

9. Show the most likely products of the following proton transfer reaction. Be sure to use the most basic compound as the base. Then draw in missing lone pairs and show the mechanism for this proton transfer reaction.

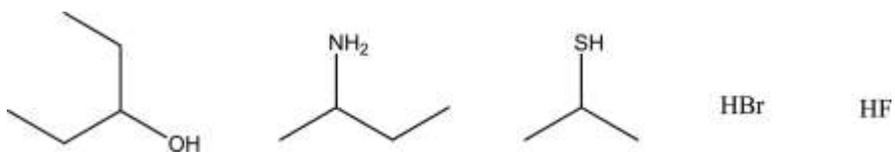


10. Which side of the equilibrium is favored for the following reaction? Explain your choice.

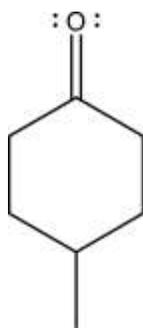


11. Explain why hydrogen atoms attached to  $sp_2$  carbons are more acidic than hydrogen atoms attached to  $sp_3$  carbons.

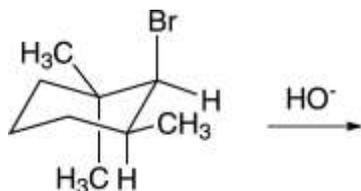
12. Rank the following compounds from most acidic (a rank of 1) to least acidic (a rank of 5).



13. Draw the enol tautomer for the following compound.



14. The following compounds undergo an E2 step when added together. Draw the mechanism for this elementary step and the resulting products.



15. Draw the product(s) of the following  $\text{S}_{\text{N}}1$  reaction.

