CHM 3140 Organic Chem. I, Dr. Starkey, Cal Poly Pomona
Final Exam Review – Practice Problems

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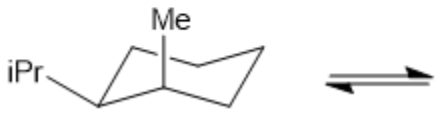
LAURIESTARKE263 to 37607

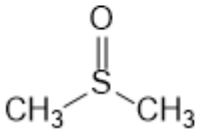
Draw the other chair conformation for the given compound. Identify each drawing as *cis* or *trans*.

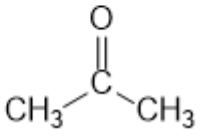
Select the equation that describes the equilibrium and explain: $K_{eq} > 1$ or $K_{eq} = 1$ or $K_{eq} < 1$

1

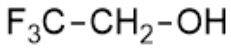


2 One of the following compounds is planar at the central atom and the other is pyramidal. Identify the correct geometry of each compund and briefly explain the geometry of each.

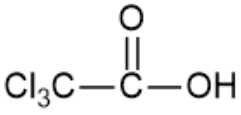




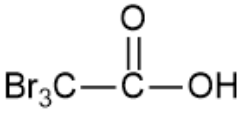
3 Identify the strongest acid and the weakest acid. Explain briefly.



X



Y

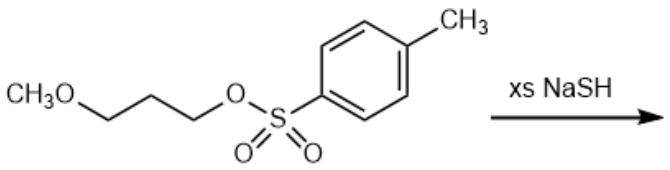


Z

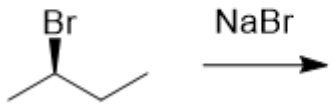
Is hydroxide a strong enough base to deprotonate propyne?
Predict the products of the proton-transfer reaction, and determine the direction of the equilibrium.

4

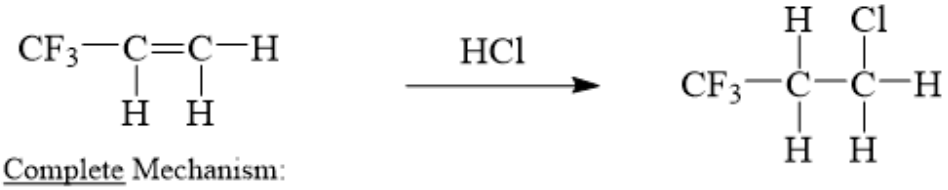
5 Predict the major product.



6 Explain why racemization of the given compound is observed during the S_N2 reaction shown.



7 Provide a complete mechanism for the following reaction. Pay close attention to details, including lone pairs, formal charges and the use of curved arrows.

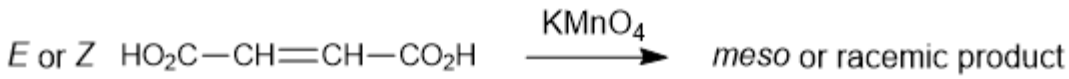


Complete Mechanism:

The product shown is the only one formed. Briefly explain the observed regiochemistry.

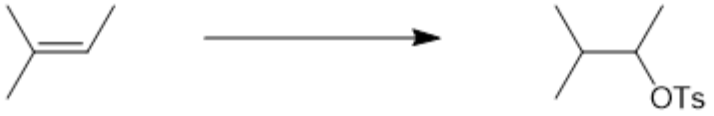
When the alkene shown is treated with potassium permanganate, the resulting product is either a *meso* compound or a racemic mixture. Determine which isomer (*E* or *Z*) gives which product.

8



Provide the reagents necessary to transform the given starting material into the desired product.
If more than one synthetic step is needed, you must show the intermediate products formed.
It may help to begin with a retrosynthesis, but you are not required to do so.

9



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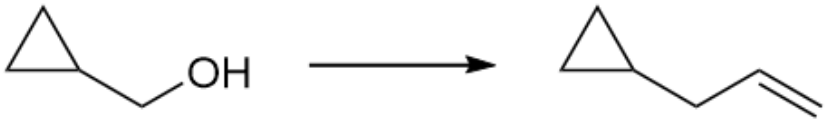
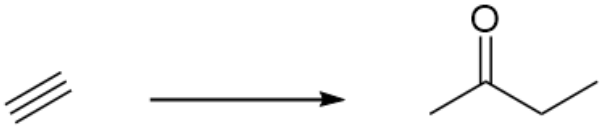
11



12



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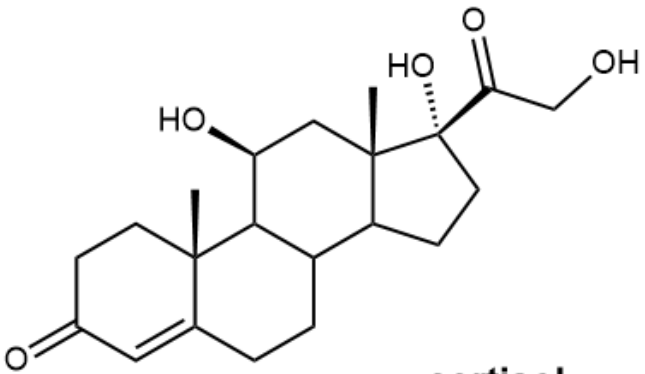
13

Cortisol is a hormone that the body releases in response to stress. HIgh levels of cortisol cause problems with memory, concentration and sleeping, and can lead to headaches, weight gain, anxiety and depression. **Relaxation** helps rid the body of cortisol, so adopting daily habits of **meditation** or **focused breathing** is good for your health and might lead to higher grades!

14

- Identify all of the chiral centers in cortisol. Use * to mark each.
- Cortisol has how many possible stereoisomers? (Nature makes only one!)
- Using the given drawing, determine the number of degrees of unsaturation (DU or HDI).
- Cortisol has 21 carbon atoms. What is its molecular formula? (CALCULATE the # of H atoms)



cortisol