Hw5: β – Eliminations

1. Explain the following terms:

(a) Regioselectivity

(b) Stereoselectivity

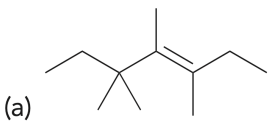
(c) Stereospecificity

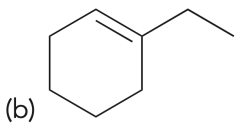
(d) Nucleophilicity

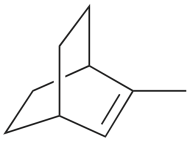
(e) Basicity

(f) Retrosynthesis

2. Assign a systematic (IUPAC) name for each of the following compounds:


(a)


(b)

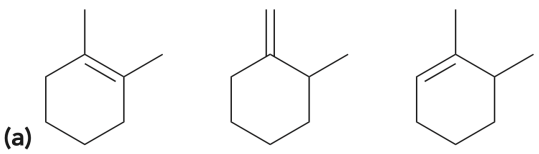

(c)

(a) _____

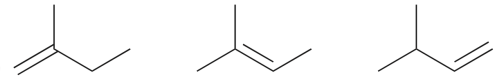
(b) _____

(c) _____

3. Arrange each set of isomeric alkenes in order of stability:

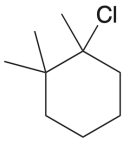

(a)

Order: _____

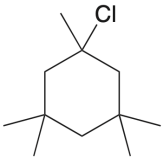
(b) 

Order: _____

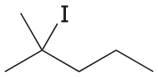
4. Identify the major and minor products for each of the following E2 reactions:

(a) 

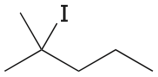
NaOEt → ?

(b) 

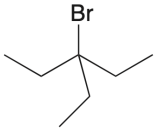
t-BuOK → ?

(c) 

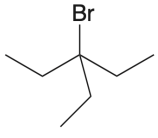
NaOH → ?

(d) 

t-BuOK → ?

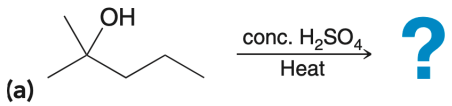
(e) 

NaOH → ?

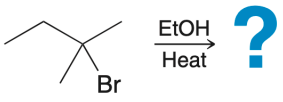
(f) 

t-BuOK → ?

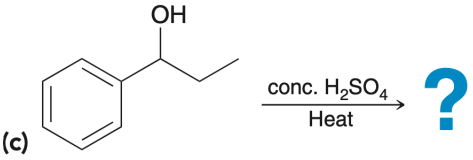
5. Identify the major and minor products for each of the following E1 reactions:



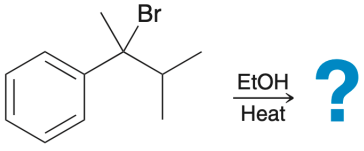
(a)



(b)

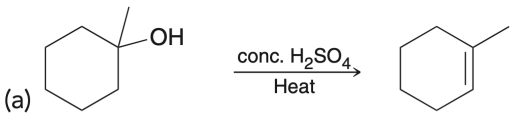


(c)



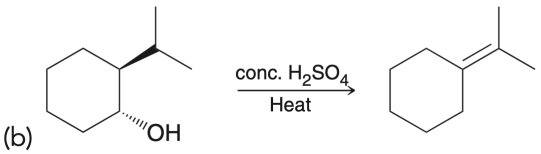
(d)

6. Propose a mechanism for each of the following transformations:

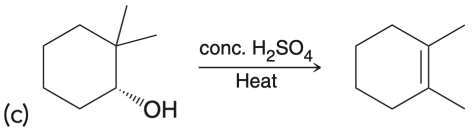


(a)

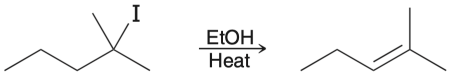
(b)

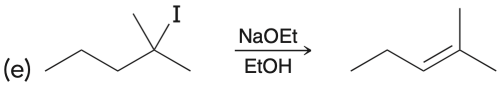


(c)

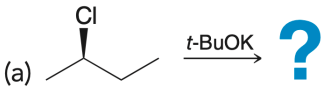


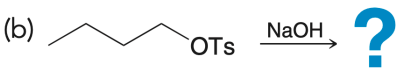
(d)

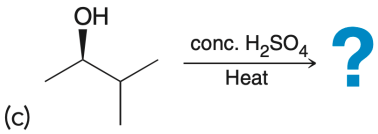


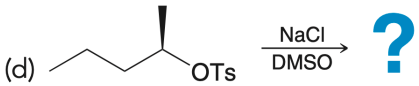
(e) 

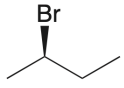
7. *Substitution vs. Elimination*: Identify the major and minor product(s) for each of the following reactions:

(a) 

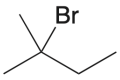
(b) 

(c) 

(d) 

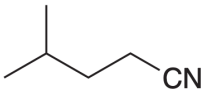
(e) 

NaOEt → ?

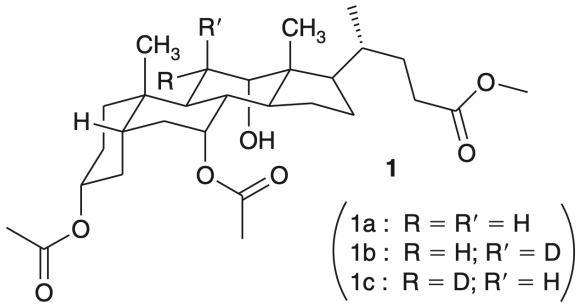
(f) 

NaOEt → ?

8. Provide a synthesis for the target molecule shown below, starting with an alkyl halide of your choice. Show your retrosynthetic analysis, and then provide a complete synthesis, showing all necessary reagents.



9. (hard) Steroids and their derivatives are among the most widely used therapeutic agents. They are used in birth control, hormone replacement therapy, and the treatment of inflammatory conditions and cancer. New stereoid derivatives are discovered regularly by systematically modifying the structure of known steroids and testing the resulting derivatives for therapeutic properties. As part of a synthetic strategy for preparing a class of promising steroid derivatives, compound **1a** was treated with TsCl and pyridine followed by sodium acetate (CH_3CO_2Na) to give compound **2a** (*Tetrahedron Lett.* **2010**, *51*, **6948–6950**).



(a) Sodium acetate functions as a base in this instance. Draw the structure of **2a**.

(b) Deuterium (D) is an isotope of hydrogen, and deuterons will typically behave very much like protons (although small differences in reaction rates are typically observed). If **1b** or **1c** were treated with TsCl and pyridine, followed by sodium acetate, **2b** or **2c** would be produced, respectively. Identify which product (**2b** or **2c**) is expected to contain deuterium and justify your choice.