

Week #5 Problem Set  
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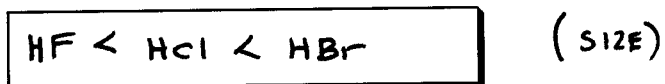
1. i) Rank the following acids according to *increasing* acidity.

A.

HCl

HF

HBr

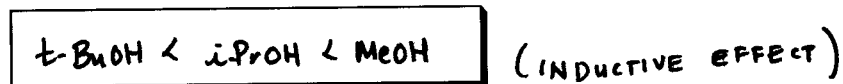


B.

*i*-PrOH

*t*-BuOH

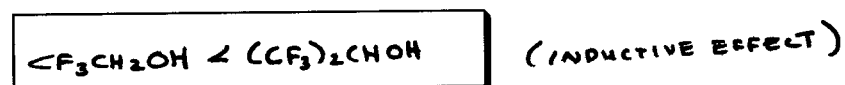
MeOH



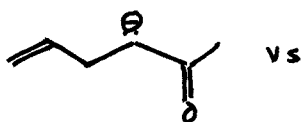
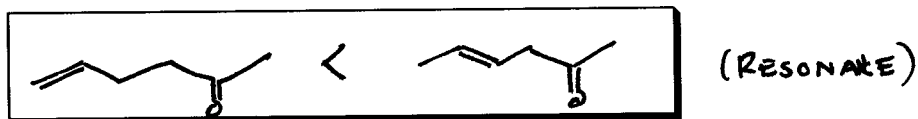
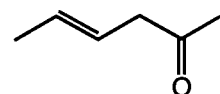
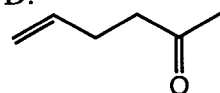
C.

$\text{CF}_3\text{CH}_2\text{OH}$

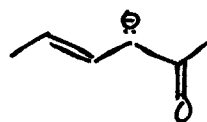
$(\text{CF}_3)_2\text{CHOH}$



D.

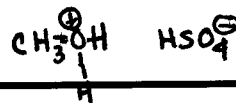
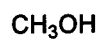


VS

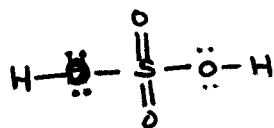


DRAW RESONANCE  
CONTRIBUTORS!

2. Show the products of the following reactions.

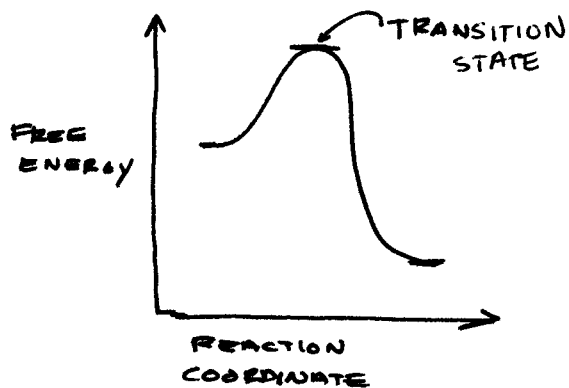


3. What is the complete structure of  $H_2SO_4$ ?



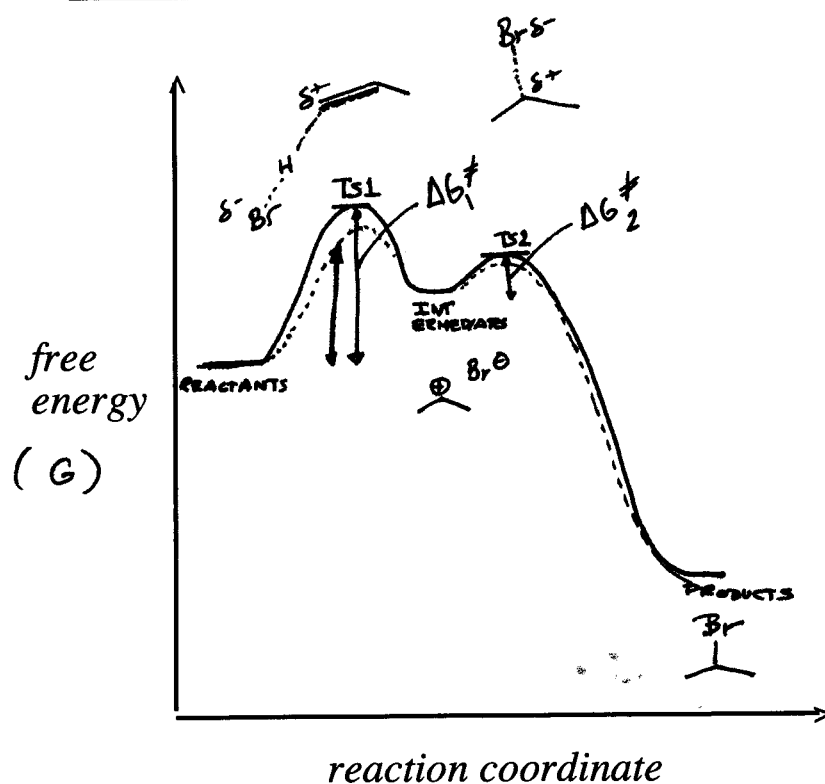
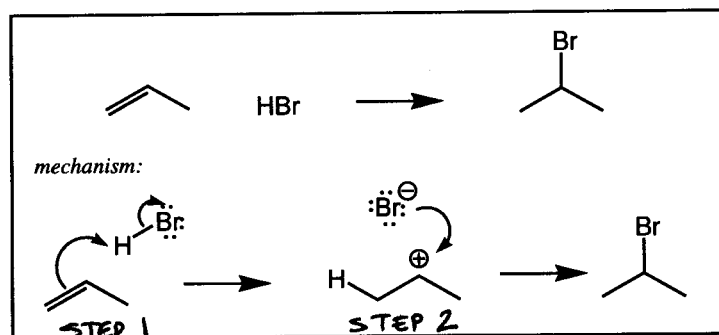
4. Define *transition state*. ( $\neq$ )

A TRANSITION STATE IS THE HIGHEST ENERGY POINT ALONG THE REACTION COORDINATE. A POINT OF BOND FORMATION AND BREAKING.



NOTE: EVERY MECHANISM STEP HAS ITS OWN TRANSITION STATE.

5. The following reaction occurs in two steps. Draw a potential energy diagram showing reactants, transition states, the intermediate, and product. Clearly label all of the above. Assume that the reaction is *exothermic*.



- 6 i) Changing only *one* variable of problem <sup>5</sup> ~~7~~, write a reaction that is *obviously* faster.  
 ii) How will the potential energy diagram change?

