

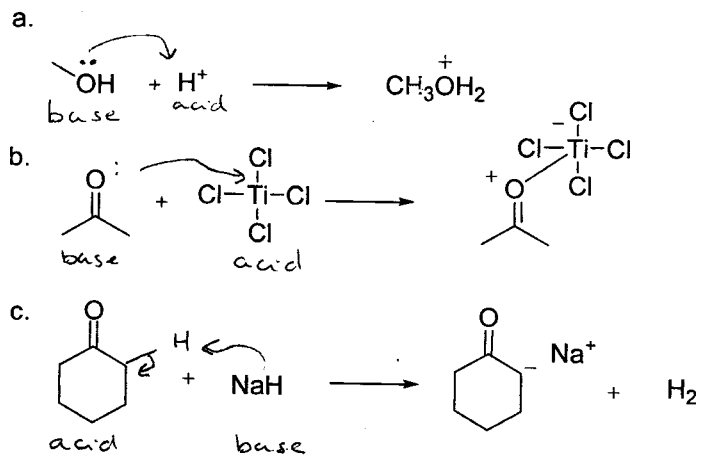
## Chem 30A- Week 6

### Things to Remember

- As acid strength goes up, pKa goes down
- Stronger the acid, the weaker the conjugate base
- Trend for electronegativity vs. stability of conjugate base holds only for groups in the same row of the periodic chart.
- Difference between hemolytic and heterolytic cleavage (and the corresponding arrows)

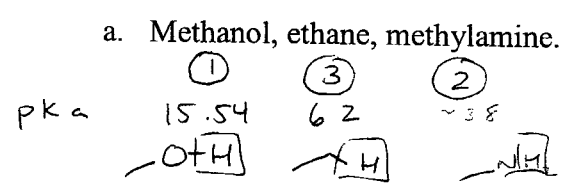
### Warm-up Exercise

Identify the acids and bases in these reactions:

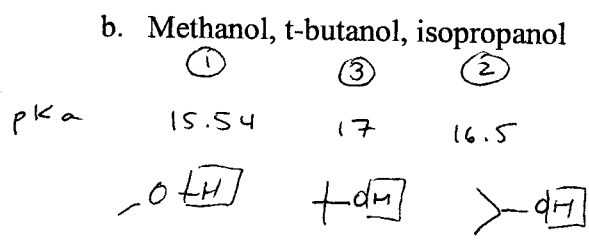


### Exercise

1. Put in order of <sup>de</sup> increasing acidity. Justify your answer. Circle acidic proton on each molecule (2 min).



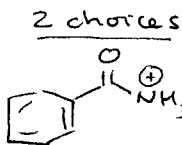
electronegativity  
 lower pKa = more acidic



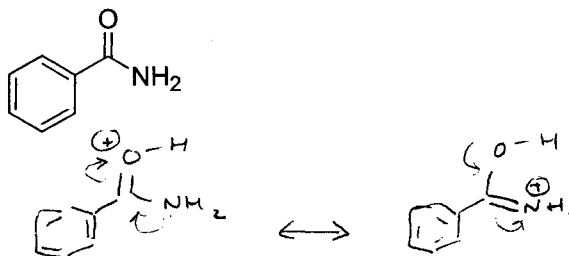
due to the inductive effect = e<sup>-</sup> donation through σ bonds

2. Which is more basic the carbonyl or the amine moiety of benzamide (3 min)?

more basic = more able to keep protons.



protonation of the amine



there are more ways to stabilize the product when the carbonyl acts as the base.  $\therefore$  C=O is more basic than the amine.

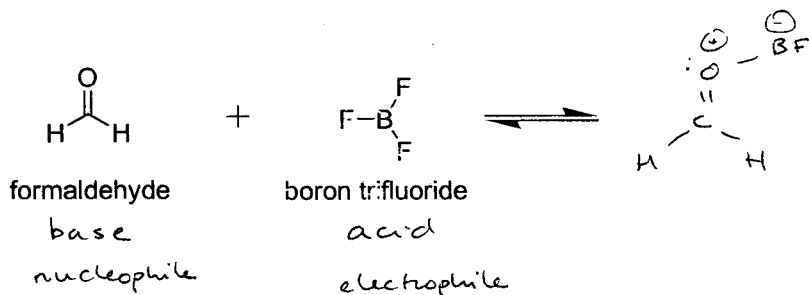
3. If you had never seen  $\text{BF}_3$  before, how would you decide if it was a nucleophile or an electrophile (3 min)?



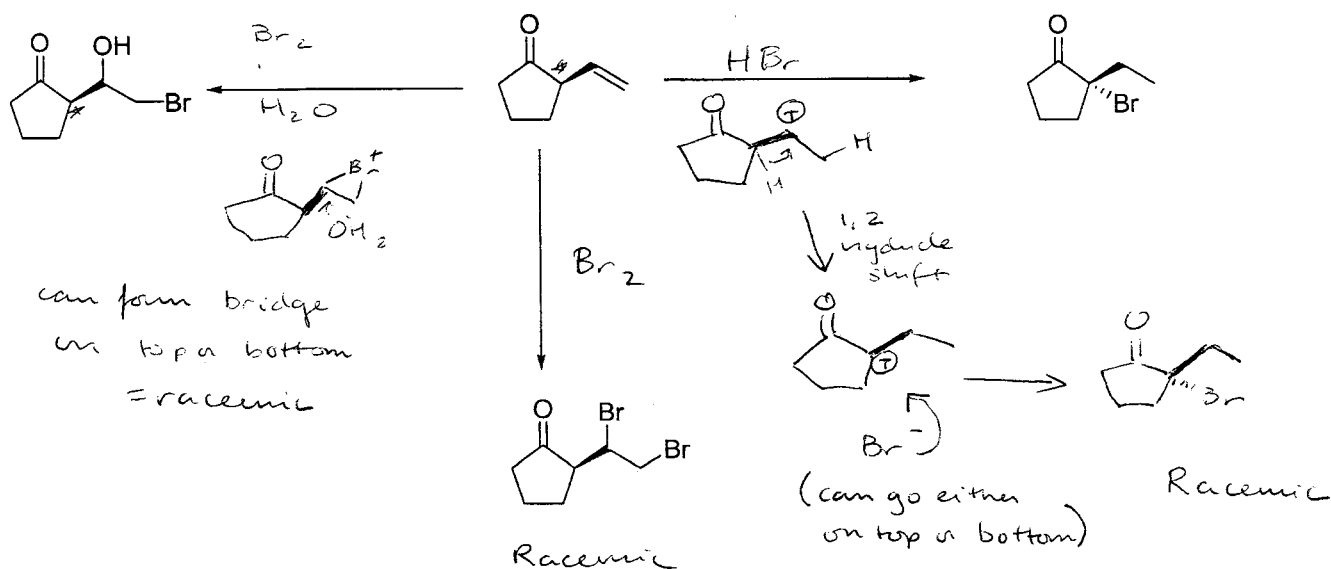
Boron does not have a full octet around it  
 - it is electron poor.  
 - it can accept  $e^-$ 's w/o violating the octet rule.

$\therefore$  it is an electrophile.

b. Formaldehyde and boron trifluoride for an acid-base complex- draw the complex. Which is the acid, which is the base?

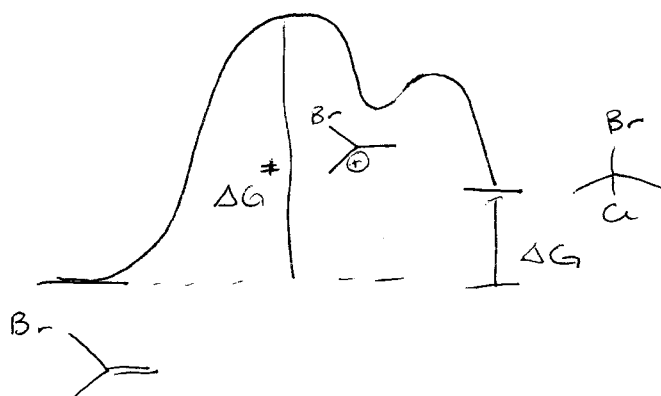


4. Fill in the reactants. Say whether or not the product will be racemic.



5. Given the following information, draw the energy profile of the described reaction. Is it kinetically or thermodynamically stable? (10 min.)

2-bromo propene when mixed with hydrochloric acid, gave the Markovnikov product with a  $\Delta G^\ddagger$  of 60 kJ/mol and a  $\Delta G$  of 42 kJ/mol.



Kinetically stable (large  $\Delta G^\ddagger$ )  
Thermodynamically unfavored