Name:	Date:	Pd:

Acid-Base Organic Chemistry TEST – 3

Directions: Complete only what is asked for each question. Complete sentences are NOT necessary, but complete responses are! <u>Make sure you explanations/justifications are specific!</u>

- 1. What is the difference between an acid and a base? (specifically, what is their function according to the Bronsed-Lowry definition?)
- 2. Briefly explain how the strengths of acids can be determined from analyzing their conjugate bases.
- 3. Label the parts of the following reaction. (use: A, CA, B, CB on the line below the molecule)

$$H_2O + \swarrow - NH_3^+ \longrightarrow H_3O^+ + \bigotimes - NH_2$$

4. List what the "4 factors" are in order of significance, then <u>briefly</u> describe how they work:

a.	
b.	
c.	
d.	

5. Which is a stronger acid, HF or HBr? <u>Draw the conjugate bases of each</u> and <u>justify/explain</u> your reasoning.

6. For each of the acids, determine <u>CIRCLE the stronger acid</u> and <u>justify/explain</u> your reasoning . You may draw the resulting conjugate bases, if needed, but it is not necessary.



- 7. True or False: (circle one) Resonance with many carbon atoms is better than resonance with one oxygen atom.
- 8. Circle the more acidic pKa value: 2.3 or 6.45
- 9. <u>Draw</u> the shape/size of orbitals <u>in order</u> of triple, double, and single bonds from left to right. <u>Label</u> the hybridization for each type of orbital.

- 10. Explain how you predict the shift of equilibrium in an acid-base reaction?
- 11. <u>Show the mechanism</u> for the following reaction and <u>predict the direction of equilibrium</u> by drawing a large arrow or circling the side the equilibrium will shift towards. <u>Justify</u> your answer!

$$+_{OH} + _{H_3C} \overset{O}{\not{\hspace{-0.4em} \hspace{-0.4em} \overset{O}{\not{\hspace{-0.4em} \hspace{-0.4em} \hspace{-0.4em} \hspace{-0.4em} \hspace{-0.4em} \hspace{-0.4em} \hspace{-0.4em} \hspace{-0.4em} }}$$

12. Decide which hydrogen is the most acidic, then **draw the mechanism** and **predict the products** for the following molecule reacting with <u>hydroxide</u>:



13. Decide which hydrogen is the most acidic, then **draw the mechanism** and **predict the products** for the following molecule reacting with the <u>amide ion</u> (-NH₂)

 \leftrightarrow

+

- 14. In numbers 11 and 12, go back and <u>label</u> the parts as (A, CA, B, CB) on the lines below the molecules.
- 15. In numbers 11 and 12, go back and <u>predict the direction of equilibrium</u> by circling either the product or reactant side. Then justify your reasoning near the right margin of the paper.

BONUS:

- 1. What is something you studied, but was not asked on the test? (1pt)
- 2. What is the alpha effect? (explain and draw an example of what it would look like) (1pt)
- 3. Draw the Lewis structure for CCl₂O and determine if the molecule is polar or nonpolar. (Hint: You need to draw the proper dipoles and partial charges on the molecule according to its molecular geometry.) (1pt)