

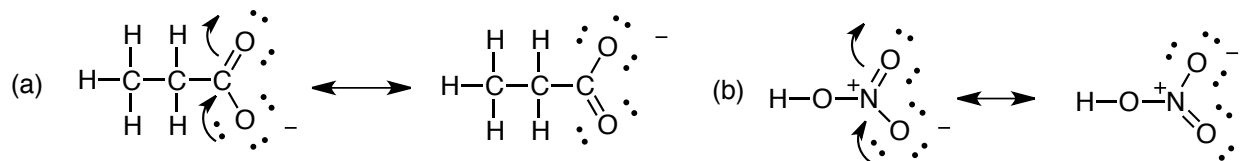
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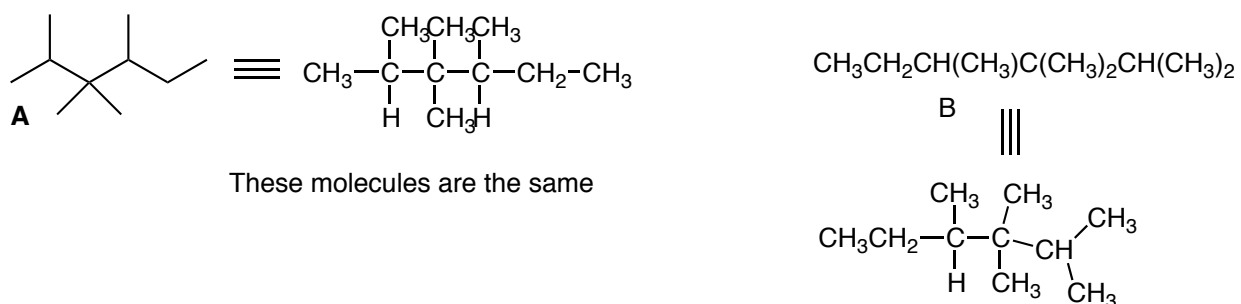
Chem. 121, Sect 008, Quiz 1

Fall, 2011, 50 points

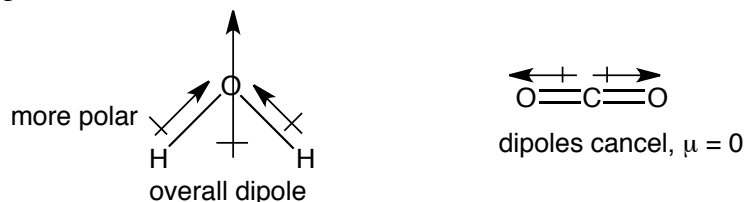
1. Write Lewis structures for the following compounds. Assign formal charges, if any, to the correct atom(s). Show all unpaired electrons and also show all possible resonance structures. (10 pts.) (a)  $C_2H_5CO_2^-$  (b)  $HNO_3$  (10 pts)



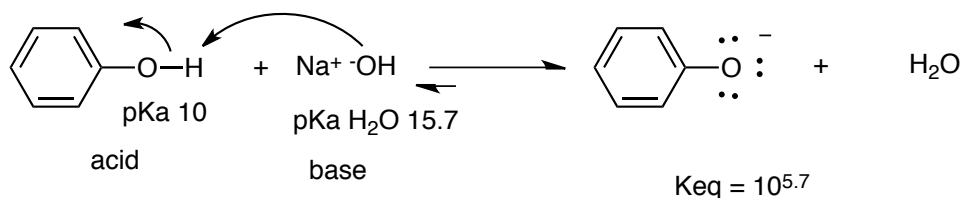
2. (a) Make expanded drawing of both **A** and **B**. (b) What is the relationship between the following molecules? (They can be structural isomers, the same molecule, or different molecules) (10 points)



3. Which is more polar,  $H_2O$  or  $CO_2$ ? Explain by making careful 3-dimensional drawings showing all individual dipole moments and the overall dipole moment for each molecule. (10 pts)



4. For the following acid-base reaction, identify the acid and the base, give the product and the equilibrium constant. Be sure to use the arrow formalism to show the correct movement of the electrons. (10 pts)



5. One student isolated 4-*t*-butylphenol as her unknown in step 2 (m.p. 101-102°C) in the lab. She got a white solid with an m.p. of 90-96°C. She was not sure that she had the correct compound. (a) Was her compound a pure substance? Explain briefly. (b) How could she prove with certainty that her compound is the correct one? Explain briefly. (10 pts)

(a) compound impure, broad and lowered m.p. (b) mix some known *t*-butylphenol with the unknown; if m.p. does not change, then unknown is for certain *t*-butylphenol.