Week 4 Worksheet

1. Which of the following statements is a correct definition for a Lewis base? (5 pts)
   a) Proton acceptor  
   b) Proton donor  
   c) Electron pair acceptor  
   d) Electron pair donor

2. Which of the following species is the conjugate base of ammonia, NH₃? (5 pts)
   a) NH₄⁺  
   b) NH₂⁻  
   c) NH₂⁻  
   d) CH₃NH₃⁺

3. Draw the curved arrow mechanism for the reaction below: (5 pts)
   \[\text{HCOOH} + \text{H₂O} \rightleftharpoons \text{HCOO}^- + \text{H}_3\text{O}^+\]

4. Which of the following compounds is the strongest acid? (5 pts)
   a) I  
   b) II  
   c) III  
   d) IV

5. Rank the following compounds in order of increasing pKa. (5 pts)
   a) I < III < IV < II  
   b) II < IV < III < I  
   c) II < III < I < IV  
   d) IV < I < III < II

6. Rank the following compounds from lowest to highest melting point.
7. Determine whether the compounds are soluble in water or in organic solvent.

\[ \text{OH} \quad \text{CH}_3(\text{CH}_2)_7\text{OH} \quad \text{NaCl} \]

8. For the following molecule classify the selected Carbons and Hydrogens as either 1°, 2°, or 3°.
9. Circle the most acidic hydrogen(s) and label all the functional groups.