1) Classify the following as acid, base, amphoteric or neutral:
   - NH₃
   - CH₃COOH
   - HNO₃
   - H₂O
   - NaCl

2) Circle the acidic proton in the following compounds:
   - CH₄
   - CH₃OH
   - HC=CH
   - CH₃COOH

3) What is the conjugate acid of: NH₂⁻, CH₃OH?

4) What is the conjugate base of: NH₃, CH₃OH, H₂SO₄?

5) Write the products of the following acid base equation. Label all chemicals as acid, base, conjugate acid or base also. Draw arrows if you can to show the movement of electrons.

   \[ \text{CH₃COOH} + \text{NaOH} \rightarrow \]

6) Label the strongest and the weakest acid from below?
   - CH₄
   - CH₃OH
   - HC=CH
   - CH₃COOH

7) Which of the following compounds is the strongest acid?
   a. CH₃CH₂CH₂COOH
   b. CH₃CH₂CHClCOOH
   c. CH₃CHClCH₂COOH
   d. ClCH₂CH₂CH₂COOH

8) Which of the following is the strongest base?
   a. iodide anion, I⁻
   b. fluoride anion, F⁻
   c. bromide anion, Br⁻
   d. chloride anion, Cl⁻

9) The equilibrium of one of the two reactions given below will be going forward while one is forward. Predict which is going forward and give the reason for your answer.

   \[ \text{HC≡CH} + \text{NH}_2^- \rightleftharpoons \text{HC≡C}^- + \text{NH}_3 \]
   - pKₐ = 25
   - pKₐ = 38

   \[ \text{HC≡CH} + \text{OH}^- \rightleftharpoons \text{HC≡C}^- + \text{H}_2\text{O} \]
   - pKₐ = 25
   - pKₐ = 16

10) Identify the Lewis acids and Lewis bases from the following compounds:
    - BF₃
    - NH₃
    - AlCl₃
    - Fe²⁺
    - S²⁻