8. Circle the molecule in the pair that is expected to have higher boiling/melting point. (6 pts.)

a) CH₃CH₂F; b) HSO₃⁻

9. Rank the molecules in each series according to their relative acidity. Use 1 for the most acidic, 2 for the next most acidic and so on. (12 pts)

a) 

b) O₂N-CH₂-CH₂-CH₂-COOH CH₃-CH₂-CH₂-COOH CH₃-CH₂-CH-COOH

b) 1 3 5

c) 3 1 5 4 2

10. Circle the molecule or ion in the pair that is expected to have the higher pKa for the unionized carboxylic acid: (8 pts)

a) CH₃COOH FCH₂COOH

b) HO--COOH HO--COO⁻ (Note: one carboxyl group is ionized)
11. Rank the bonds, indicated as ‘—’, according to their polarity. Use 1 for most polar, 2 for the next most polar, and so on. (8 pts)

   a) \( \text{H}_3\text{C} \equiv \text{Cl} \) \hspace{1cm} \( \text{H}_3\text{C} \equiv \text{OCH}_3 \) \hspace{1cm} \( \text{H}_3\text{C} \equiv \text{SCH}_3 \) \hspace{1cm} \( \text{H}_3\text{C} \equiv \text{POH} \)

   b) \( R_3\text{C} \equiv \text{COOH} \) \hspace{1cm} \( R_3\text{C} \equiv \text{NO}_2 \) \hspace{1cm} \( R_3\text{C} \equiv \text{CHO} \)

12. Bezafibrate is the drug of choice for treatment of hypertriglyceridemia. Indicate the hybridization state of the atoms marked as ‘*’ (a total of 4 asterisks). (4 pts)

13. Rank the following molecules according to their basicity. Use 1 for most basic, 2 for the next most basic and so on. (12 pts)

   a) \( \text{HN(CH}_3\text{)}_3 \) \hspace{1cm} \( \text{HN(CF}_3\text{)}_3 \) \hspace{1cm} \( \text{BrN(CF}_3\text{)}_4 \)

   b) \( \text{CH}_3\text{CH}_2\text{NH}_2 \) \hspace{1cm} \( \text{FCH}_2\text{CH}_2\text{NH}_2 \) \hspace{1cm} \( \text{ICH}_2\text{CH}_2\text{NH}_2 \) \hspace{1cm} \( \text{BrCH}_2\text{CH}_2\text{NH}_2 \)