1. The melting range of 4-nitrobenzyl alcohol is 92-94°C, and the melting range of triphenylmethane is 92-94°C. Which statement most accurately describes the expected result for the melting range of a 50:50 mixture of these two compounds?
   a) The mixture will have a melting range of 92-94°C.
   b) The mixture will melt over a broad temperature range below 94°C.
   c) The mixture will have a sharp melting point above 94°C.
   d) The mixture will have a sharp melting point below 92°C.

2. Which of the indicated hydrogens is the most acidic?

3. Label a pair of enantiomers and a pair of diastereomers.

4. What are products of the reactions of each of the following compounds with NH₃?

5. What ion is an intermediate in the nitration of toluene?

6. What reagent would accomplish this conversion?
7. Which of the following compounds is most reactive in a reaction with HNO₃/H₂SO₄?

8. Which reaction demonstrates electrophilic aromatic substitution?
   a)  
   b)  
   c)  

9. Are the following ions aromatic, anti-aromatic, or non-aromatic?

10. Label each reaction as an oxidation, a reduction, or neither.
    a)  
    b)  
    c)  
    d)  
11. Draw the reaction intermediate in the aldol addition of propanal.

12. Use curved arrows to show the mechanism of the acid-catalyzed formation of an enamine from an aldehyde.

13. Which is the predominant form of the amino acid serine at pH=1? 
   a) 
   \[
   \begin{align*}
   \text{HOCH}_2\text{CHCO}^+ \\
   \text{NH}_3^+
   \end{align*}
   \]
   b) 
   \[
   \begin{align*}
   \text{O} \\
   \text{OCH}_2\text{CHCOH} \\
   \text{NH}_2
   \end{align*}
   \]
   c) 
   \[
   \begin{align*}
   \text{O} \\
   \text{HOCH}_2\text{CHCO}^- \\
   \text{NH}_2
   \end{align*}
   \]
   d) 
   \[
   \begin{align*}
   \text{O} \\
   \text{HOCH}_2\text{CHCOH} \\
   \text{NH}_3^+
   \end{align*}
   \]

14. Give an example of each of the following types of reactions:
   a) Wittig reaction
   b) Haloform reaction
   c) Addition of a Gilman reagent to an \(\alpha,\beta\)-unsaturated ketone