**UCI DEPARTMENT OF ORGANIC CHEMISTRY PEER TUTORING REVIEW SESSION FEEDBACK EVALUATION**

<table>
<thead>
<tr>
<th>Quarter: Fall 2017</th>
<th>Date: October 20, 2017</th>
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<tbody>
<tr>
<td>Class: Professor Shea</td>
<td>Midterm 1 Review</td>
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</tbody>
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**Tutors’ Names:** Phuc Nguyen, Kathy Vu, Amelia Ooi

**COMMENTS/ SUGGESTIONS**

<table>
<thead>
<tr>
<th>Phuc Nguyen:</th>
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<tr>
<td>Kathy Vu:</td>
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<td>Amelia Ooi:</td>
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(VERY IMPORTANT!)

What worked best?

What could be improved?

What would you like to see next time?

<table>
<thead>
<tr>
<th><strong>This review was interactive and engaging</strong></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither Agree or Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
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<td>Comments:</td>
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<tr>
<th><strong>The presentation volume was acceptable.</strong></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither Agree or Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
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<th><strong>The presentation was visually clear and logically organized.</strong></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither Agree or Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
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<td>Comments:</td>
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<td>The review improved/reinforced your understanding of the material:</td>
<td>☐ ☐ ☐ ☐ ☐ ☐</td>
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<td>The quality of the review packet was excellent:</td>
<td>☐ ☐ ☐ ☐ ☐ ☐</td>
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Please fill out this evaluation, even if you plan to leave early. Thank you very much.
Midterm 1 Review Packet

1) (a) Identify the hybridization for every carbon shown in the molecule. (b) What are the bond angles on all the bonds? (c) Which bond is the most highly polarized? (d) Where is the most acidic hydrogen?

2) Draw the resonance structures for the following structures:

a) 

b)
3) For the following compounds, determine the molecular geometry and indicate if the molecule is polar or nonpolar. What kind of intermolecular forces would you expect to be the most significant?

a) CO₂
c) NH₃

b) CHCl₃
d) CO₃²⁻

4) Indicate whether each pair of molecules represents a set of isomers or a set of resonance structures. For resonance structures use curved arrows to show how to interconvert the structures both ways. Also indicate which is the best contributor to the resonance hybrid.
5. Draw the arrow mechanism and products for the following acid-base reaction. Label the acid, base, conjugate acid, and conjugate base. Then, circle the favored equilibrium reaction.

a. 

\[
\begin{align*}
\text{H} & & \text{N} \equiv \text{H} + \text{O} \equiv \text{H} \\
\end{align*}
\]

b. 

\[
\begin{align*}
\text{H}_2\text{N} & & \text{C} = \text{O} + \text{K}^+ \equiv \text{O} \equiv \text{OH} \\
\end{align*}
\]

c. 

\[
\begin{align*}
\text{CH}_3\text{N} & & \text{C} = \text{O} \equiv \text{O} \equiv \text{OH} \\
\end{align*}
\]
6. Using the element effect, label the following hydrogens in order of increasing acidity.

7. Circle the more acidic molecule.

8. Indicate the stronger base.
10. Consider the following reaction:
   i. Draw the arrow-pushing mechanism and products.
   ii. Determine the pKa values of the acids.
   iii. Calculate the $K_{eq}$ of the reaction.
   iv. Indicate whether the equilibrium lies to the **left** or **right**.

\[
\begin{align*}
\text{products} & = \quad \text{products} \\
K_{eq} &= 
\end{align*}
\]
11. 
   a) Identify the functional groups with heteroatoms in each molecule:

   ![Chemical structures]

   b) Rank each of the following compounds in order of decreasing water solubility:
      (a) ![Chemical structure]
      (b) ![Chemical structure]
      (c) ![Chemical structure]

   c) Rank each of the following compounds in order of increasing boiling point:
      (a) ![Chemical structure]
      (b) ![Chemical structure]
      (c) ![Chemical structure]
d) Identify the nucleophile and electrophile in the following reactions. Use curved arrow notation to show the flow of electrons.