1. Convert the following molecule from line bond notation to a Lewis structure that shows all the carbon and hydrogen atoms.

![Molecule](image)

2. What is the relationship between the following two molecules? Are they identical, constitutional isomers, stereoisomers or unrelated?

![Molecules](image)

3. What is the official IUPAC name of the following molecule?

![Molecule](image)

4. Draw both chair forms of the molecule shown below and circle the one that is lower in energy.

![Molecule](image)
1. Convert the following molecule from line bond notation to a Lewis structure that shows all the carbon and hydrogen atoms.

![Cyclopropene](image)

2. What is the relationship between the following two molecules? Are they identical, constitutional isomers, stereoisomers or unrelated?

![Methanol](image)  
![Formaldehyde](image)

3. What is the official IUPAC name of the following molecule?

![Cyclohexanol](image)

4. Draw both chair forms of the molecule shown below and circle the one that is lower in energy.

![Cyclohexanone](image)
1. Convert the following molecule from line bond notation to a Lewis structure that shows all the carbon and hydrogen atoms.

2. What is the relationship between the following two molecules?
   Are they identical, constitutional isomers, stereoisomers or unrelated?

3. What is the official IUPAC name of the following molecule?

4. Draw both chair forms of the molecule shown below and circle the one that is lower in energy.
1. Convert the following molecule from line bond notation to a Lewis structure that shows all the carbon and hydrogen atoms.

![Molecule Image]

2. What is the relationship between the following two molecules? Are they identical, constitutional isomers, stereoisomers or unrelated?

![Molecule Images]

3. What is the official IUPAC name of the following molecule?

![Molecule Image]

4. Draw both chair forms of the molecule shown below and circle the one that is lower in energy.

![Molecule Images]
1. Convert the following molecule from line bond notation to a Lewis structure that shows all the carbon and hydrogen atoms.

![Lewis structure of a molecule with additional hydrogens](image)

2. What is the relationship between the following two molecules? Are they identical, constitutional isomers, stereoisomers or unrelated?

![Two molecules with hydroxyl groups](image)

3. What is the official IUPAC name of the following molecule?

![Cyclohexanol molecule with a propyl side chain](image)

3-propyl-1-cyclohexanol

4. Draw both chair forms of the molecule shown below and circle the one that is lower in energy.

![Two chair forms of a molecule with hydroxyl and methyl groups](image)
Lab Instructor Belyayeva Malik Mollica

Quiz Ic
February 22, 2016

1. Convert the following molecule from line bond notation to a Lewis structure that shows all the carbon and hydrogen atoms.

2. What is the relationship between the following two molecules? Are they identical, constitutional isomers, stereoisomers or unrelated?

3. What is the official IUPAC name of the following molecule?

4. Draw both chair forms of the molecule shown below and circle the one that is lower in energy.
1. What is the formal charge on the C atom in the molecule shown below?

\[ :\text{C}≡\text{N} \]

2. Two resonance forms of the same molecule are shown below. Draw arrows to show how the structure on the left would covert to the structure on the right and how the structure on the right would covert to the structure to the left.

3a. Draw a resonance structure for the molecule shown below.

3b. If your resonance structure has any formal charges, be sure to show them clearly.
1. What is the formal charge on the O atom in the molecule shown below?

2. Two resonance forms of the same molecule are shown below. Draw arrows to show how the structure on the left would convert to the structure on the right and how the structure on the right would convert to the structure to the left.

3a. Draw a resonance structure for the molecule shown below.  
3b. If your resonance structure has any formal charges, be sure to show them clearly.
1. What is the formal charge on the N atom in the molecule shown below?

![Molecule with N atom](image)

2. Two resonance forms of the same molecule are shown below. Draw arrows to show how the structure on the left would convert to the structure on the right and how the structure on the right would convert to the structure to the left.

![Resonance Structures](image)

3a. Draw a resonance structure for the molecule shown below.

3b. If your resonance structure has any formal charges, be sure to show them clearly.

![Resonance Structure](image)
Quiz IIA
February 29, 2016

1. What is the formal charge on the C atom in the molecule shown below?

\[ \text{:C} \equiv \text{N} \quad -\]

2. Two resonance forms of the same molecule are shown below. Draw arrows to show how the structure on the left would covert to the structure on the right and how the structure on the right would covert to the structure to the left.

3a. Draw a resonance structure for the molecule shown below.
3b. If your resonance structure has any formal charges, be sure to show them clearly.
1. What is the formal charge on the O atom in the molecule shown below?

\[
\text{O} \quad \text{(zero)}
\]

2. Two resonance forms of the same molecule are shown below. Draw arrows to show how the structure on the left would convert to the structure on the right and how the structure on the right would convert to the structure to the left.

3a. Draw a resonance structure for the molecule shown below.
3b. If your resonance structure has any formal charges, be sure to show them clearly.
1. What is the formal charge on the N atom in the molecule shown below?

\[ \text{N}^+ \]

2. Two resonance forms of the same molecule are shown below. Draw arrows to show how the structure on the left would covert to the structure on the right and how the structure on the right would covert to the structure to the left.

![Resonance forms diagram]

3a. Draw a resonance structure for the molecule shown below.
3b. If your resonance structure has any formal charges, be sure to show them clearly.

![Resonance structure diagram]
1. What is the relationship between the following two molecules? Are they identical, enantiomers, diastereomers or constitutional isomers?

   ![Molecules](image1.png)

2. Label all chiral centers in the molecule shown below.

   ![Molecule](image2.png)

3. Determine the R/S configuration of the chiral center shown below. Make sure to clearly indicate the priority (1, 2, 3 or 4) of each group attached to the chiral carbon.

   ![Chiral Center](image3.png)
Quiz IIIb
March 28, 2016

1. What is the relationship between the following two molecules? Are they identical, enantiomers, diastereomers or constitutional isomers?

```
\[ \text{CH}_3 \quad \text{Cl} \quad \text{Br} \quad \text{H} \quad \text{CH}_3 \\
\text{Br} \quad \text{Cl} \quad \text{H} \quad \text{CH}_3 \]
```

2. Label all chiral centers in the molecule shown below.

```
\[ \text{HO} \quad \text{NH}_2 \\
\text{O} \quad \text{H} \quad \text{OH} \quad \text{H} \\
\text{H} \quad \text{H} \]
```

3. Determine the R/S configuration of the chiral center shown below. Make sure to clearly indicate the priority (1, 2, 3 or 4) of each group attached to the chiral carbon.

```
\[ \text{OH} \\
\text{CH}_3 \]
```
1. What is the relationship between the following two molecules? Are they identical, enantiomers, diastereomers or constitutional isomers?

```
CH₃
Br ------- OH
Cl ------- H
CH₃
```

```
CH₃
Br ------- OH
H ------- Cl
CH₃
```

2. Label all chiral centers in the molecule shown below.

```
CH₂OH
H ------- OH
H ------- OH
H ------- OH
H ------- H
```

3. Determine the R/S configuration of the chiral center shown below. Make sure to clearly indicate the priority (1, 2, 3 or 4) of each group attached to the chiral carbon.

```
NH₂
```

```
CH₃
```
1. What is the relationship between the following two molecules? Are they identical, enantiomers, diastereomers or constitutional isomers?

\[
\begin{align*}
\text{CH}_3 & \quad \text{Cl} \quad \text{Br} \\
\text{HO} & \quad \text{H} \\
\text{CH}_3 & \\
\end{align*}
\]

\[
\begin{align*}
\text{Cl} & \quad \text{Br} \\
\text{H} & \quad \text{OH} \\
\text{CH}_3 & \\
\end{align*}
\]

2. Label all chiral centers in the molecule shown below.

\[
\begin{align*}
\text{O} & \quad \text{NH} \quad \text{O} \\
\text{C} & \quad \text{C} \\
\text{OH} & \\
\text{CH}_3 & \\
\end{align*}
\]

3. Determine the R/S configuration of the chiral center shown below. Make sure to clearly indicate the priority (1, 2, 3 or 4) of each group attached to the chiral carbon.
1. What is the relationship between the following two molecules? Are they identical, enantiomers, diastereomers or constitutional isomers?

2. Label all chiral centers in the molecule shown below.

3. Determine the R/S configuration of the chiral center shown below. Make sure to clearly indicate the priority (1, 2, 3 or 4) of each group attached to the chiral carbon.
Name ____________________________

Lab Instructor  Belyayeva  Malek  Mollica

Quiz IIIc  
March 28, 2016

1. What is the relationship between the following two molecules? Are they identical, enantiomers, diastereomers or constitutional isomers?

```
\[ \begin{array}{c}
  \text{CH}_3 \\
  \text{Br} \quad \text{OH} \\
  \text{Cl} \quad \text{H} \\
  \text{CH}_3
\end{array} \quad \begin{array}{c}
  \text{CH}_3 \\
  \text{Br} \quad \text{OH} \\
  \text{H} \quad \text{Cl} \\
  \text{CH}_3
\end{array} \]
```

2. Label all chiral centers in the molecule shown below.

```
\[ \begin{array}{c}
  \text{CH}_2\text{OH} \\
  \text{H} \quad \text{OH} \\
  \text{H} \quad \text{OH} \\
  \text{H}
\end{array} \]
```

3. Determine the R/S configuration of the chiral center shown below. Make sure to clearly indicate the priority (1, 2, 3 or 4) of each group attached to the chiral carbon.

```
\[ \begin{array}{c}
  \text{NH}_2 \\
  \text{CH}_3 \\
  \text{H} \\
  \text{H}
\end{array} \]
```
1. Give the product of the following reaction:

1 equivalent of

\[ \text{H}_3\text{C} - \text{CH}_3 \]

\[ \text{OH} \]

2. Fill in the missing reagent:

\[ \text{Ag(NH}_3\text{)}^{2+} \]

3a. Which functional group (acetal or hemiacetal) is shown in the molecule below?

3b. Draw the structures of the aldehyde and alcohol(s) that were used to synthesize this compound:
1. Give the product of the following reaction:

\[
\text{2 equivalents of } \quad \text{H}_3\text{C} - \text{CH} \xrightarrow{\text{NaBH}_4} \text{CH}_3\text{CH}_2\text{OH}
\]

2. Fill in the missing reagent:

3a. Which functional group (acetal or hemiacetal) is shown in the molecule below?

3b. Draw the structures of the aldehyde and alcohol(s) that were used to synthesize this compound:

\[
\text{HO} \quad \text{H}_3\text{C} - \text{CH} \quad \text{HO} \quad \text{H}_3\text{C} - \text{CH}
\]
1. Give the product of the following reaction:

\[ \text{1 equivalent of} \]
\[ \text{H} \quad \text{K} \quad \text{H} \]

2. Fill in the missing reagent:

\[ \text{NaBH}_4 \]
\[ \text{OH} \]

3a. Which functional group (acetal or hemiacetal) is shown in the molecule below?
3b. Draw the structures of the aldehyde and alcohol(s) that were used to synthesize this compound: