Resonance Exam Preparation Pack

Section A: Identifying Proper Resonance Forms

A-1 Which of these molecules is NOT a resonance form of

A
\[
\begin{array}{c}
\text{A} \\
\text{B} \\
\text{C} \\
\text{D}
\end{array}
\]

A-2 Which of these represents a pair of resonance forms?

A
\[
\begin{array}{c}
\text{A} \\
\text{B} \\
\text{C} \\
\text{D}
\end{array}
\]
A-3 Which of these represents a pair of resonance forms?


Section B: Identifying Important Resonance Forms

B-1 Which resonance form is more important?


B-2 Which resonance form contributes the most to the resonance hybrid of

B-3 Which resonance form contributes the most to the resonance hybrid of

Section C: Drawing Curved Arrows

C-1 Draw in the curved arrows to convert left-hand resonance forms to the right-hand resonance form.
C-2 Draw in the curved arrows to convert the left-hand structures to the right-hand structures.

Section D: Draw One Resonance Form For The Molecule

D-1 Draw a more important contributing structure for each of these two examples. Use curved arrows and show formal charges.

D-2  a) Draw a reasonable resonance structure for this molecule:

b) Which is more favorable? Why?

c) Draw the resonance hybrid of this molecule (use partial bonds and partial charges as required)
D-3  Draw a single REASONABLE resonance structure of these species. Use curved arrows. Show lone pairs and formal charges.

\[
\text{Structure 1} \quad \text{Structure 2}
\]

Section E: Draw all resonance forms for a molecule, or all “reasonable” resonance forms.

E-1  Create two reasonable resonance drawings for this molecule:

\[
\text{Structure 1} \quad \text{Structure 2}
\]

Of the three resonance forms, which is the least important (“stable”)?

E-2  Draw two resonance structures and use curved arrow notation to show how they can be interconverted

\[
\text{Structure 1} \quad \text{Structure 2}
\]
E-3 Draw two resonance structures and use curved arrow notation to show how they can be interconverted.

\[
\begin{align*}
\text{H}_3\text{C} & \quad \text{O} \\
\text{O} & \quad \text{OCH}_3
\end{align*}
\]

Which one is most important, and why?

E-4 Draw two other contributing structures for this species.

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

Which one is most important, and why?

E-5 Draw the next two most important resonance forms of each molecule. Indicate formal charges.

\[
\begin{align*}
\text{O} & \quad \text{C} \\
\text{C} & \quad \text{O} \\
\text{O} & \quad \text{H}
\end{align*}
\]

\[
\begin{align*}
\text{N} & \quad \text{C} \\
\text{C} & \quad \text{N}
\end{align*}
\]
E-6 Provide three additional reasonable resonance structures for each of the following compounds.
E-7 Draw all other reasonable resonance structures (if any)
E-8 Draw all other reasonable resonance structures for these molecules.

E-9 Draw the important resonance forms of this molecule:
E-10 Draw important resonance forms of:

\[ \text{H}_2\text{N} - \text{NH}_2 \quad \text{NH}^{-} \quad \text{N}^+\text{N}^- \]

E-11 Draw all other reasonable resonance structures.

\[ \text{C}_6\text{H}_5\text{O}^- \quad \text{O}^+\text{Me} \quad \text{CH}_2\text{C} \quad \text{C}^-\text{O} \]
Section F - Draw Resonance Forms And Structure

F-1 Draw the two most important contributing structures for nitromethane CH$_3$NO$_2$ which has N bonded to C and no bonds between oxygens.

F-2 Draw both resonance forms of diazomethane [CH$_2$N$_2$]. Show lone pairs and any formal charge.

F-3 Draw the most important resonance forms of CH$_3$NCHO [hint: not cyclic]

Section G - Which Carbon Bears Partial Charge?

G-1 Which carbons bear partial negative charge? Justify with resonance structures.
G-2 Which carbons bear partial positive charge? Justify with resonance structures.

Section H - Draw Radical Resonance Forms

H-1 Show interconversion between these resonance forms using curved arrow notation. Which is more important?
H-2 Draw all resonance forms for this molecule and indicate which is the most important.

H-3 Draw all resonance structures for the compound below.