1. Draw a Lewis dot structure for each of the following condensed structural formulas.

\[(\text{CN})_2\text{CC(CN)}_2\] \[\text{CH}_3\text{CN}\] \[\text{CH}_3\text{C(NH)}\text{CH}_3\]

What is the hybridization of each carbon atom in each structure?

Rank the compounds by molecular dipole.

2. Consider the following anions

\[\text{CH}_3\text{C(O)}\text{CH}_2\] \[\text{CH}_3=\text{CCHCH}_2\] \[\text{CH}_3\text{CH}_2\text{CH}_2\] \[\text{CH}_3\text{CO}_2-\]

Draw a Lewis dot structure for each anion. For anions that can resonate, draw all relevant resonance structures.

For each compound, indicate which atoms the negative charge can be located.

What is the hybridization of the atom(s) the negative charge is located?

Draw the conjugate for each anion.

Rank the anions by stability.

Rank the conjugates by acidity.
3. Consider the following three sets of reactants.

\[
\text{KOH} \quad \text{HCl} \quad \rightarrow
\]

\[
\text{CH}_3\text{Br} \quad \text{CH}_3\text{ONa} \quad \rightarrow
\]

\[
\text{CH}_3\text{MgBr} \quad \text{CH}_3\text{C(O)CH}_3 \quad \rightarrow
\]

In each set of reactants, identify the atom that has excess electron density (called a Lewis base or nucleophile) and the atom that has a deficiency of electron density (called a Lewis acid or electrophile).

Use curved arrow pushing to demonstrate formation of new bonds and breaking of old bonds during a reaction.

Label each reactant as a nucleophile or an electrophile. (Realize any reaction must be between one nucleophile and one electrophile. Cannot have a reaction between two nucleophiles or two electrophiles.)