Academic Honesty Policy. Academic honesty is strictly enforced on quizzes, exams, and other aspects of this course. Academic dishonesty will result in a failing grade in the class and a letter in the student's file. Activities constituting academic dishonesty include:

**Cheating**
- Copying from others during an examination.
- Communicating exam answers with other students during an examination.
- Offering another person's work as one's own.
- Taking an examination for another student or having someone take an examination for oneself.
- Tampering with an examination after it has been corrected, then returning it for more credit.
- Using unauthorized materials, prepared answers, written notes, or concealed information during an examination.

**Dishonest Conduct**
- Stealing or attempting to steal an examination or answer key from the instructor.
- Allowing another student to copy off of one's own work during a test.

**Collusion**
- Any student who knowingly or intentionally helps another student perform any of the above acts is subject to discipline for academic dishonesty.

I understand and will abide by this academic honesty policy: __________________________ (signature) Seat: ______

1. The pKₐ of three different C–H bonds is given below. (Smith 2.40, 5 pts)

   \[
   \text{CH}_3\text{CH}_2\text{CH}_2\text{H} \quad \begin{array}{c}
   \text{pK}_a = 50 \\
   \text{propane}
   \end{array} \quad \text{CH}_2=\text{CH}_2=\text{CH}_2\text{H} \quad \begin{array}{c}
   \text{pK}_a = 43 \\
   \text{isobutylene}
   \end{array} \quad \text{CH}_3\text{C}=\text{CH}_2\text{H} \quad \begin{array}{c}
   \text{pK}_a = 19.2 \\
   \text{acetone}
   \end{array}
   \]

   a. For each compound, draw the conjugate base, including all possible resonance structures:

   propane (conjugate base)  isobutylene (conjugate base)  acetone (conjugate base)

   b. Explain the observed trend in pKₐ:

   Isobutylene has a lower pKₐ than propane, because **the conjugate base of isobutylene is stabilized by resonance (delocalization of the negative charge), while that of propane is not.**

   Acetone has a lower pKₐ than isobutylene, because **the conjugate base of acetone has a resonance structure with the negative charge on oxygen which is more electron negative than carbon.**

2. For the following reactions: (1) Label the reactants as either acids or bases; (2) Draw in all lone pairs of electrons, and assign formal charges to the products; and (3) Draw curved arrows to indicate the flow of electrons. (5 pts)

   \[
   \text{Acid} + \begin{array}{c}
   \text{base}
   \end{array} \rightarrow \begin{array}{c}
   \text{products}
   \end{array}
   \]