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 $pK_a$ of three different C–H bonds is given below. (Smith 2.40, 5 pts)

   - **Propane**
     - $pK_a = 50$
   - **Isobutylene**
     - $pK_a = 43$
   - **Acetone**
     - $pK_a = 19.2$

   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 $pK_a$:

   - Isobutylene has a lower $pK_a$ than propane, because __________________________________________________________
     _______________________________________________________________________________________________________
     _______________________________________________________________________________________________________

   - Acetone has a lower $pK_a$ than isobutylene, because __________________________________________________________
     _______________________________________________________________________________________________________
     _______________________________________________________________________________________________________

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)

   $$\text{O} \quad \text{O} \quad + \quad \text{N} \quad \text{N} \quad \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \quad \text{N} \quad \text{H}$$