Problem Set #1 Solutions

1. Lower pKa $\Rightarrow$ stronger acid

Stronger acid has more stable (weaker) conjugate base. Need to compare stabilities of conj. bases:

$$\text{H} - \text{C} - \text{O} \longrightarrow \text{H} - \text{C} - \text{O} + \text{H}^+$$

\[\text{1} \text{ conjugate of 1} \]

\[\downarrow \text{resonance structures} \]

$$\text{H} - \text{C} - \text{O} \iff \text{H} - \text{C} - \text{O} \iff \text{1} \text{ KEY RES. STRUCTURE} \]

$$\downarrow \text{resonance structures for 1-3}$$

1. 2. 3.

\[\text{H} - \text{C} - \text{O} \not\iff \text{H}_3\text{C} - \text{C} - \text{O} \iff \not\text{N} - \text{C} - \text{O} \iff \text{additional res. structure} \]

no additional res. structure
Plus,

CH₃ is inductively e⁻ donating
DESTABILIZES CONJ. BASE
₂ weaker acid

NO₂ is Θ⁺
STABILIZES CONJ. BASE
₂ stronger acid

So then: → increasing acidity →

H₃C-COH < H-CH=CH-OH < O₂N-CH=CH-OH

2. H₃C=CCH₃ → H-Br

³° carbocation
v. stable

can attack either face of + (see below)

Markovnikov
addition

Will get 2 products since you have created a chiral center (⁺⁺⁺):

H₃C-CH₃-CH₃
+ H₃C-Br-CH₃
Net stereochemistry of I's is anti to each other due to iodonium ion.

Ozonolysis of alkenes