March 25, 2002

➢**Exam #2:** *The Results*

➢**Exam #2**: *The Review*

➢Questions for Problem Session?

➢*Website updates*

  ➢Chapter 16 solns (part 2)

  ➢Chapter 15 assigned reading/probs
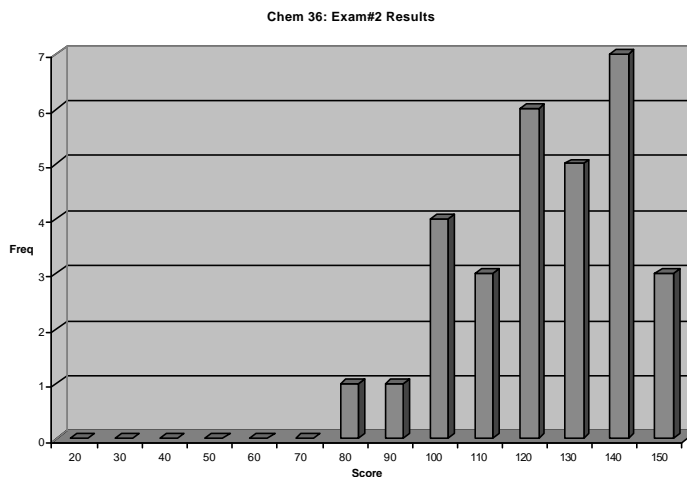
➢Quiz this Friday!

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Exam # 2 Results

Range:

76 - 149
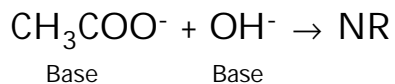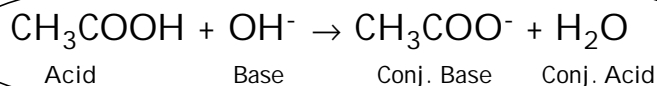
Average:

119/150

(79%)

Chem 36: Exam#2 Results

Let's Add Some NaOH

- What would happen to the pH if we added 10.00 mL of 0.0100 M NaOH to this soln?
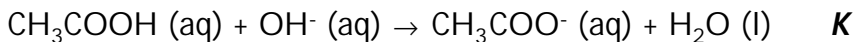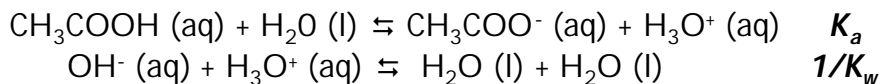
Two possible species to react with OH^-:

$$CH_3COO^- + OH^- \rightarrow NR$$

  Base   Base

Is this reaction quantitative?

$$CH_3COOH + OH^- \rightarrow CH_3COO^- + H_2O$$

  Acid   Base   Conj. Base   Conj. Acid

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What's K?

- Combine two reactions with *known values of K* to get K for the **unknown reaction**:

$$CH_3COOH\ (aq) + H_2O\ (l) \rightleftharpoons CH_3COO^-\ (aq) + H_3O^+\ (aq) \quad \textbf{\textit{K}}_a$$
$$OH^-\ (aq) + H_3O^+\ (aq) \rightleftharpoons H_2O\ (l) + H_2O\ (l) \quad \textbf{\textit{1/K}}_w$$

$$CH_3COOH\ (aq) + OH^-\ (aq) \rightarrow CH_3COO^-\ (aq) + H_2O\ (l) \quad \textbf{\textit{K}}$$

$$\boxed{K = \frac{K_a}{K_w}} = \frac{1.76 \times 10^{-5}}{1.0 \times 10^{-14}} = \textbf{\textit{1.76} } \times \textbf{\textit{10}}^9$$

General result for reaction of a weak acid with a strong base

Huge!
Reaction is *quantitative.*

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Assume Complete Reaction

- Since K is so large, assume reaction with OH- is *quantitative:*

$$CH_3COOH \text{ (aq)} + OH^- \text{ (aq)} \rightarrow CH_3COO^- \text{ (aq)} + H_2O \text{ (l)}$$
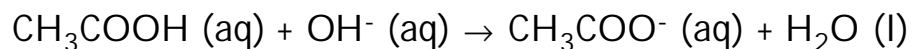
	CH_3COOH	OH^-	CH_3COO^-
I	1.00 mmol	0.100 mmol	1.00 mmol
C	-0.100 mmol	-0.100 mmol	+0.100 mmol
F	0.90 mmol	0	1.10 mmol

Note: *These are not **equilibrium** amounts!*

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