

MCA7 Amino Acids Workshop ^{part 2}

while you wait

- pen + paper
- water, snacks
- use bathroom

Type Q's / comments





The banner features a collage of chemistry-related images on the left, including a portrait of Leah, a chemical reaction diagram, and a table. The central text reads "Leah 4Sci Tutorials" in large, stylized red and blue letters. Below this, it says "HELPING STUDENTS UNDERSTAND ORGANIC CHEMISTRY WITH".



Leah Fisch

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The goal of Leah4sci tutorial videos is to help college students master difficult science concepts by providing simple explanations and practice problems. These tutorial videos are created by Leah Fisch, founder and creator of Leah4sci, a private online tutoring company. Visit my website for additional details.

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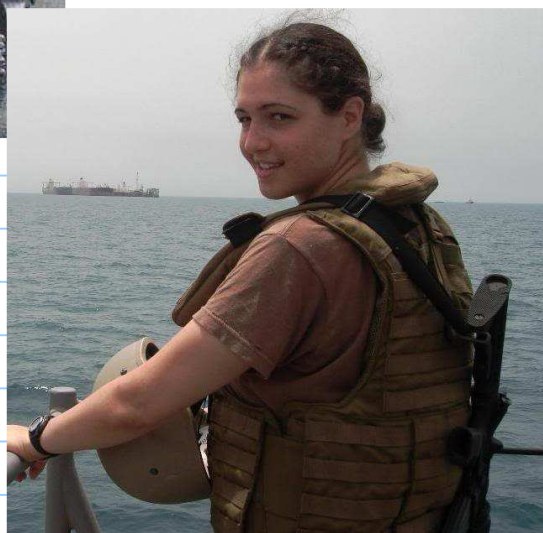
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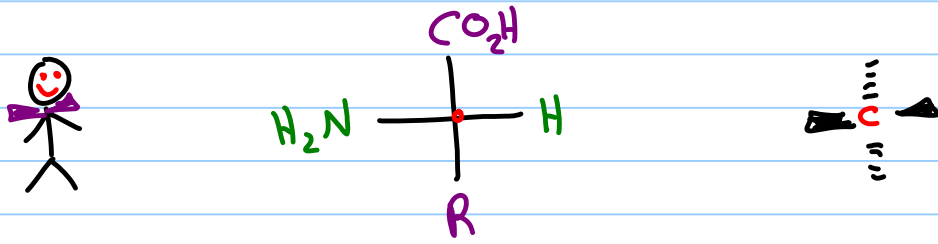
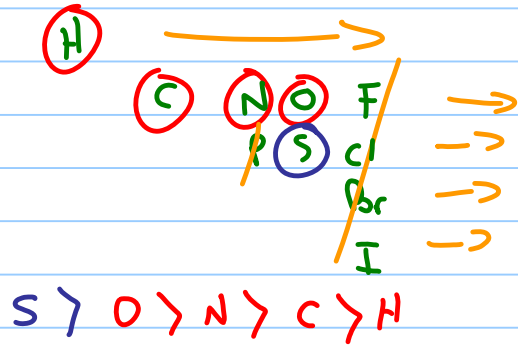
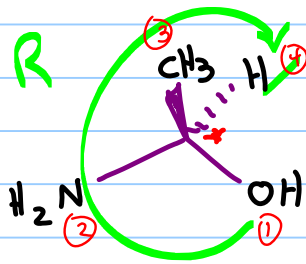
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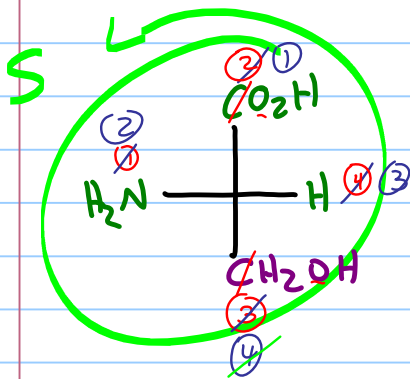


Chirality of AA

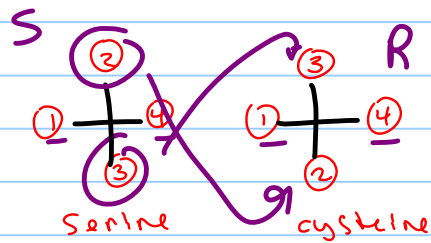
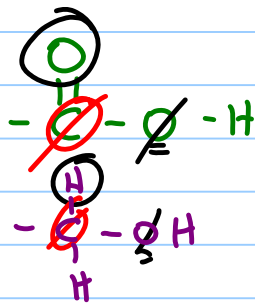
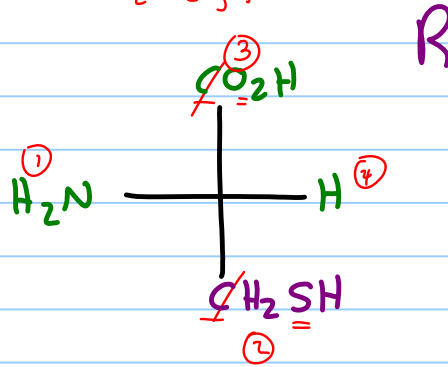


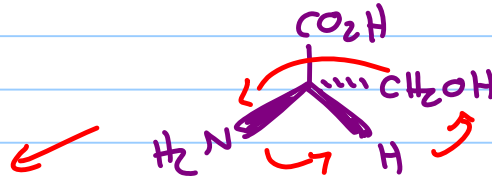
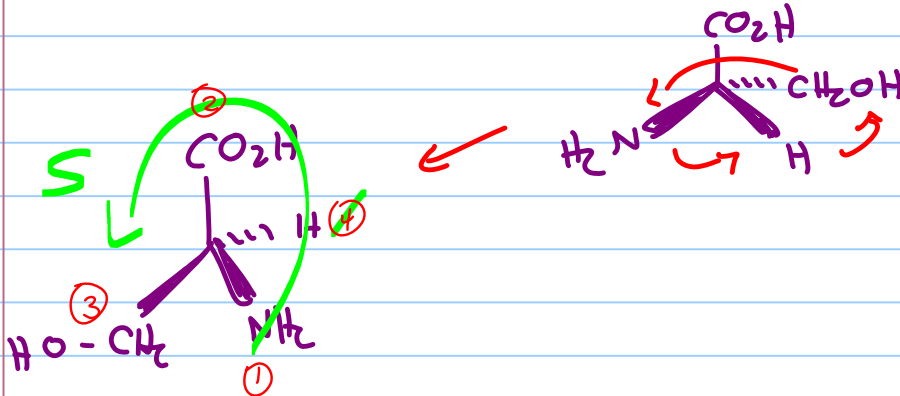
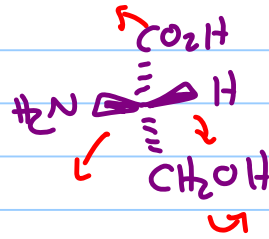
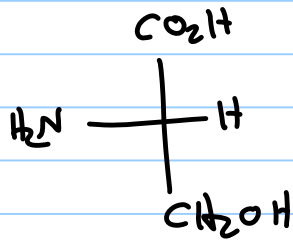
L-AA

L-serine

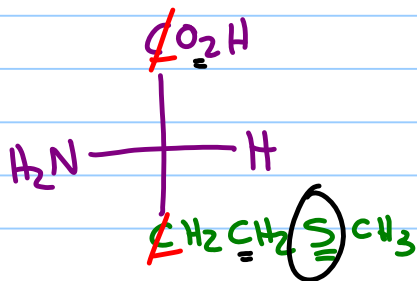


L-cysteine

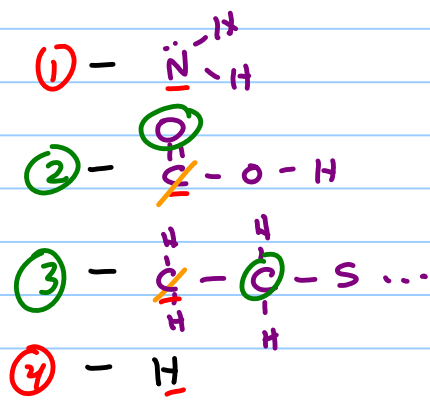




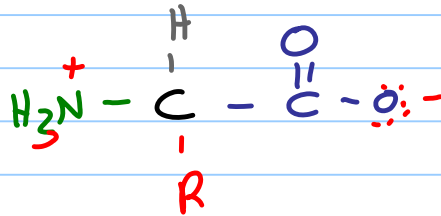
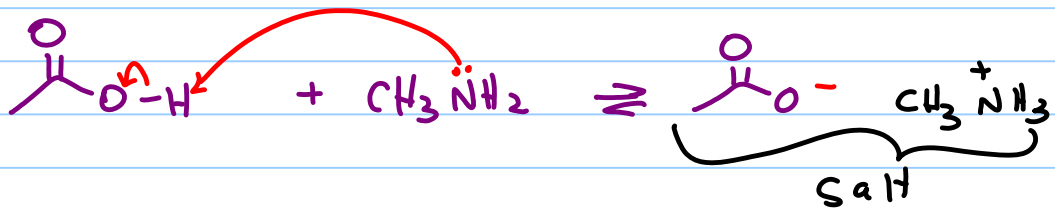
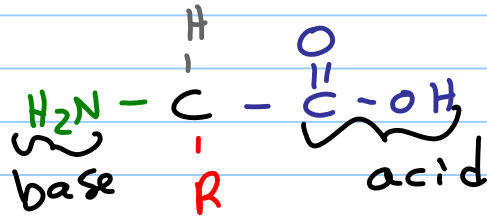
L-AA priority $\text{NH}_2 > \text{R} > \text{CO}_2\text{H}$ = R cysteine
 $\text{NH}_2 > \text{CO}_2\text{H} > \text{R}$ = S



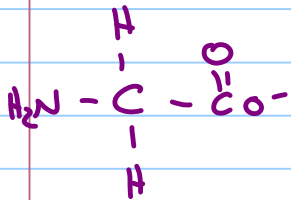
CO₂H > CH₂CH₂S...



Zwitterion



$$+1 \quad -1 \quad = 0$$





$$pK_a = 4.8$$

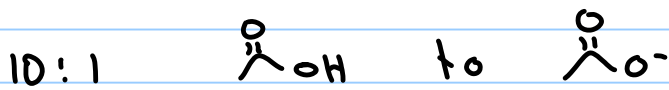
$$pH = 4.0$$

0.8 units from pK_a

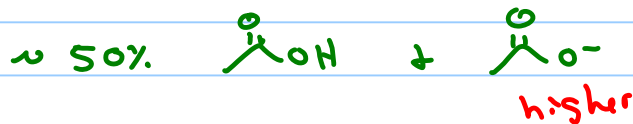
$$pH = pK_a + \log \frac{C_B}{A}$$

$$\log ? = 1$$

$$10^1 = \left[\frac{10}{1} \right]$$



pH = 5 0.2 from pK_a



$$pK_a = 4.8 \quad pH = 5$$

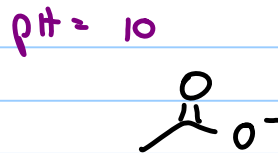
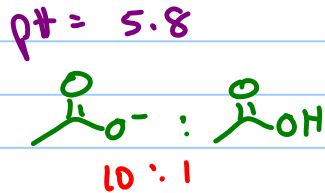
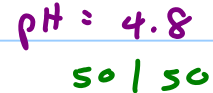
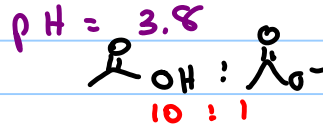
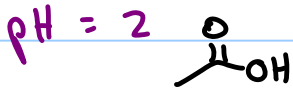
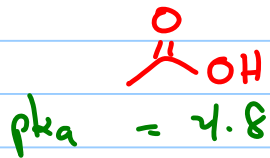
$$5 = 4.8 - 4.8 + \log \frac{C_B}{A}$$

$$0.2$$

pH vs pKa

pKa = pH at which 50% protonated
50% deprotonated
ideal buffer

$$pH = pKa + \log \left(\frac{[A^-]}{[HA]} \right)$$

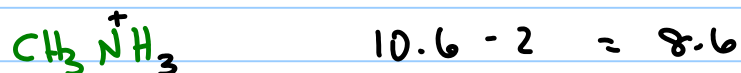
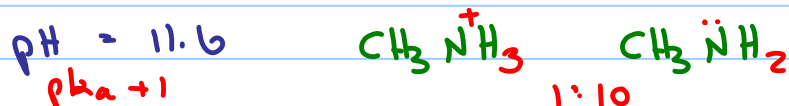
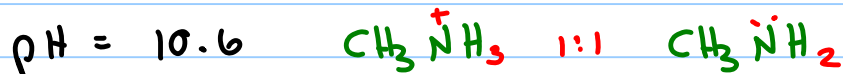
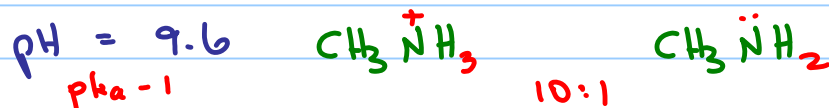
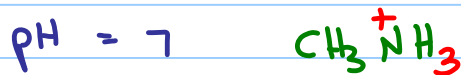
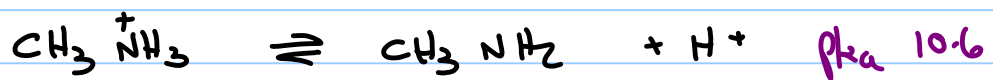
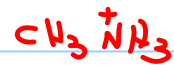


CB : A



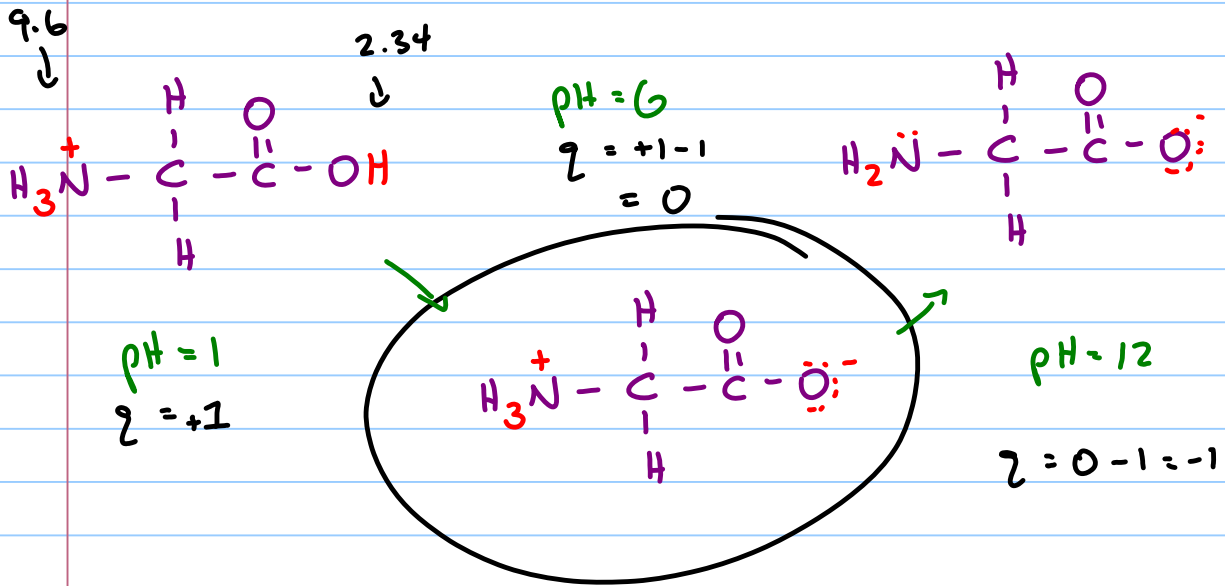
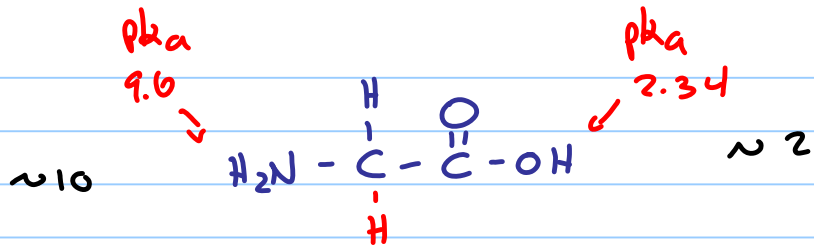
$$K_a \times K_b = K_w \quad 1 \times 10^{-14}$$

$$pK_a + pK_b = pK_w = 14$$

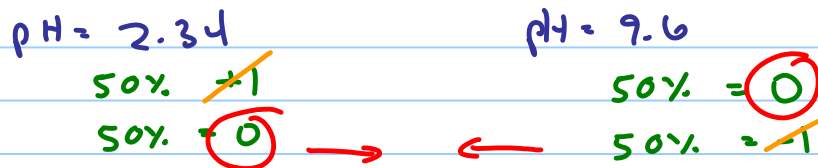


$100:1$

$A:CB$



$\text{pI} = \text{isoelectric point}$
 $\text{pH} = \text{net charge} = 0$

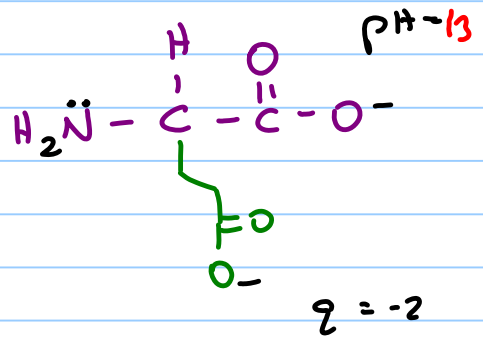
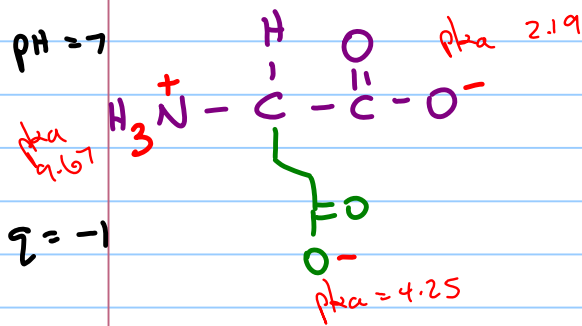
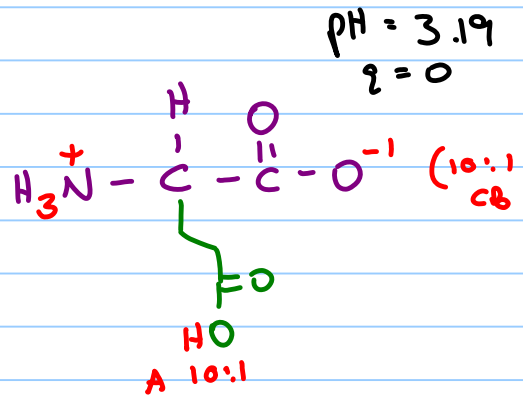
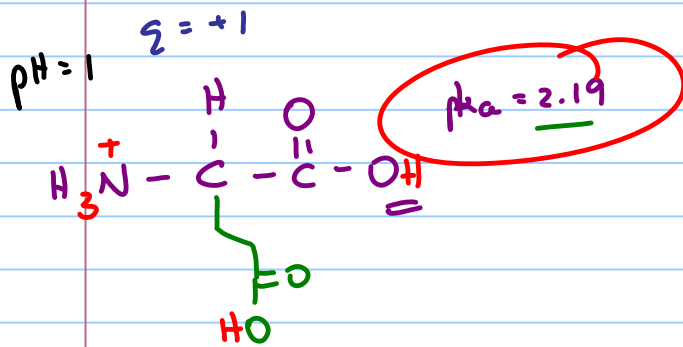
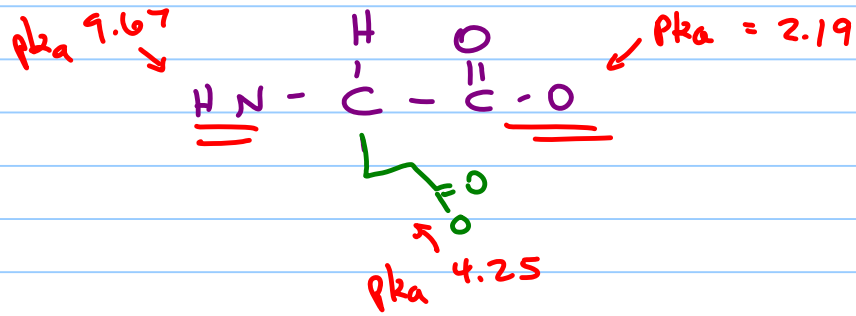


$$\text{pI} = \frac{\text{pKa}_1 + \text{pKa}_2}{2}$$

$$2.34 + 9.6$$

$$\frac{2.3 + 9.6}{2}$$

$$11.9 \sim \frac{12}{2} = 6$$



$$\text{pI} = \frac{2.19 + 4.25}{2} \sim \frac{2.2 + 4.3}{2} = \frac{6.5}{2} = 3.3 = \text{pH}$$

pI

only pKa values $\frac{pKa_1 + pKa_2}{2}$

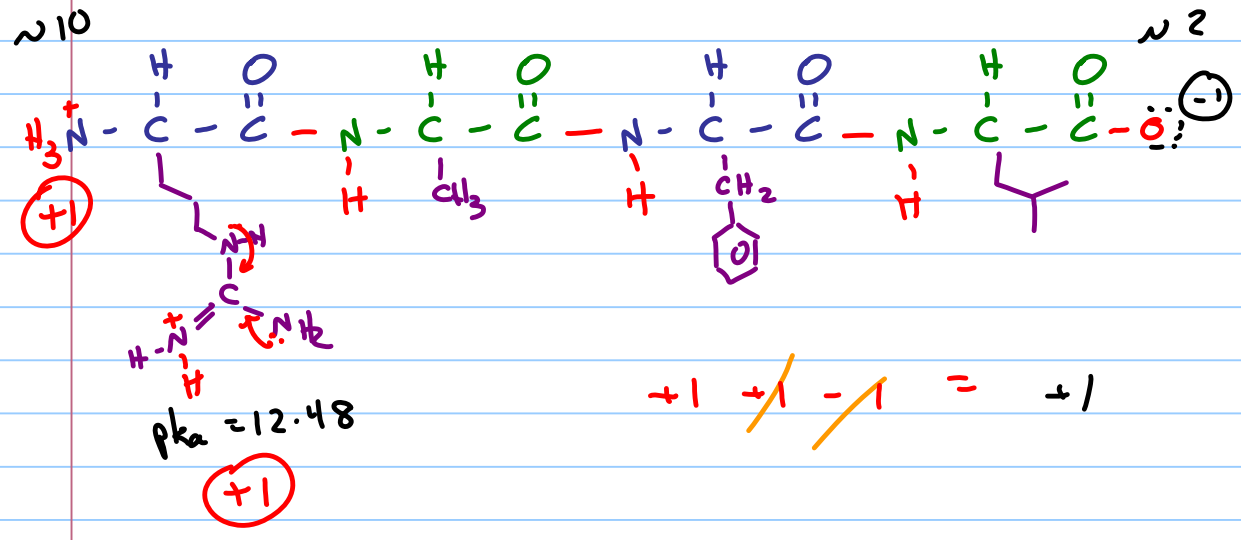
acidic AA $\frac{\text{add } 2 \text{ lower pKas}}{2}$

basic AA $\frac{\text{add } 2 \text{ upper pKas}}{2}$

ex 2.09 9.82 3.86 (Aspartic Acid)

ex 2.18 8.95 10.79 lysine
basic

Arg - Ala - Phe - Leu @ pH=8



Biochem Bootcamp

Mon May 25 - Fri May 29

Mon Jun 1 - Fri Jun 5

6pm Et 1hr

15 min break

1hr

15 min

1hr

30 hrs following ATMC outline

5 hour-long Q&A

30 hr bootcamp

5 hr Q&A

Bonus workshops

~~\$599~~ ~ \$17/hr

\$449 early Bird through Mon

Leah4Sci.com/Biochem

Bonus: FB group

Start session \$199

Leah4Sci.com/strategy

MCATStudyHall.com

+2 bonus dot hrs

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bio mini-bootcamps