

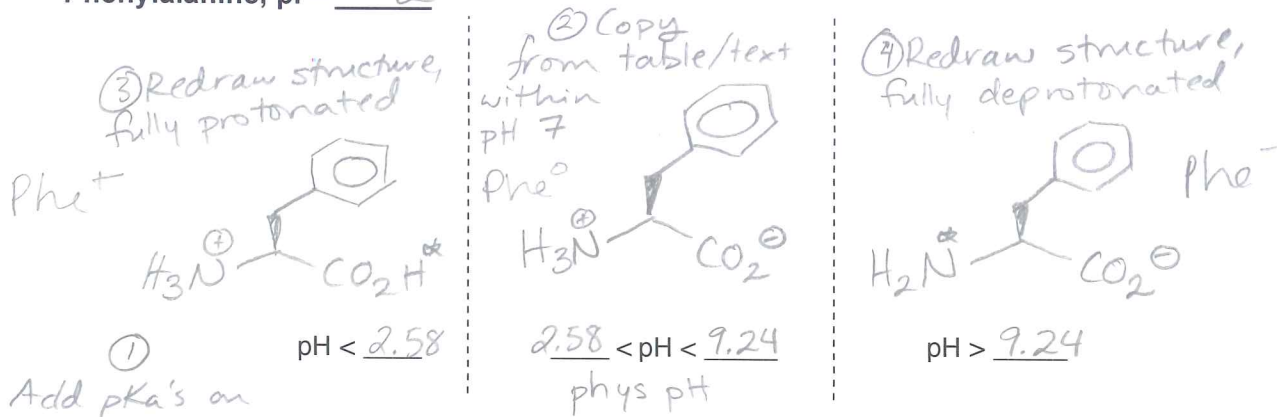
Chapter 26 HW, Part 1 – Amino Acid & Peptide Nomenclature

Amino Acids. Use the table of pKa's in the text (also posted online) to complete the following problems. Structures and pKa's will be given on the final. Isoelectric points (pI's) will not be given on the final.

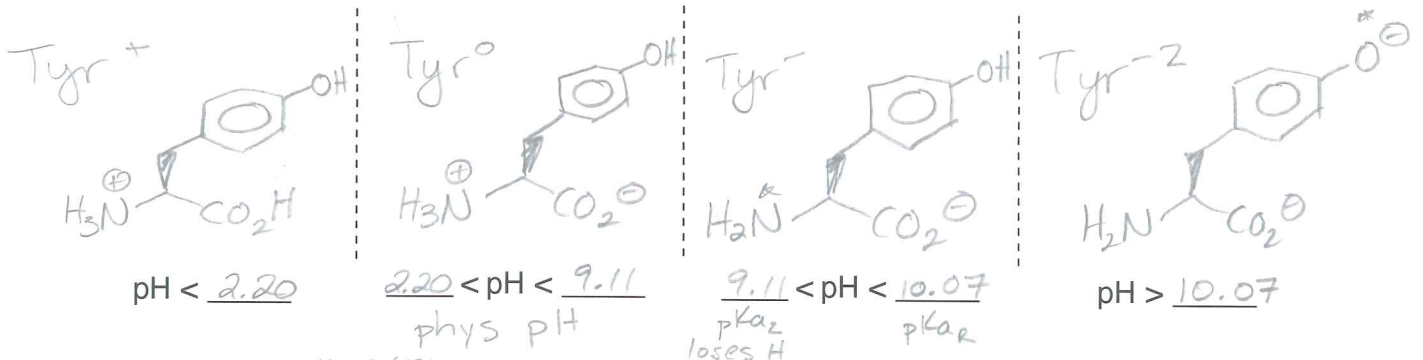
1. As the pH of a solution changes, there are different dominant ionic forms at certain pH ranges during the titration amino acids. Neutral amino acids will only have 3 ionic forms. Acidic and basic amino acids will have 4 ionic forms.

(a) Show the dominant ionic forms of phenylalanine, tyrosine, arginine, glutamic acid, and histidine throughout the full pH range (0-14). Remember that the structures provided in the text and online are at physiological pH. Calculate the pI and compare to the pI in the table.

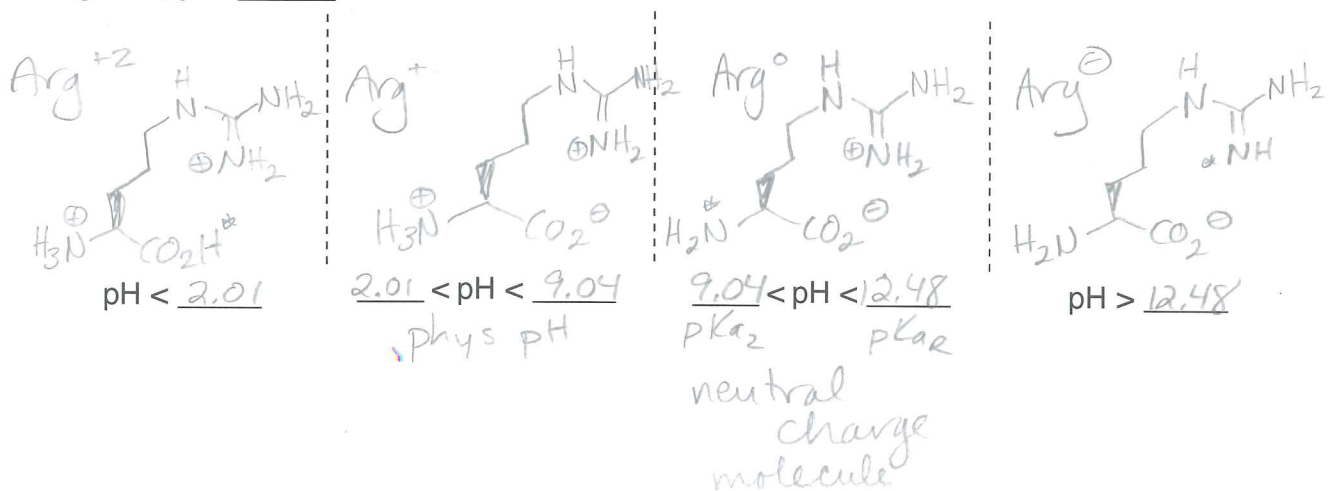
Phenylalanine, $pI = \frac{2.58 + 9.24}{2} = 5.91$



Tyrosine, $pI = \frac{2.20 + 9.11}{2} = 5.63$

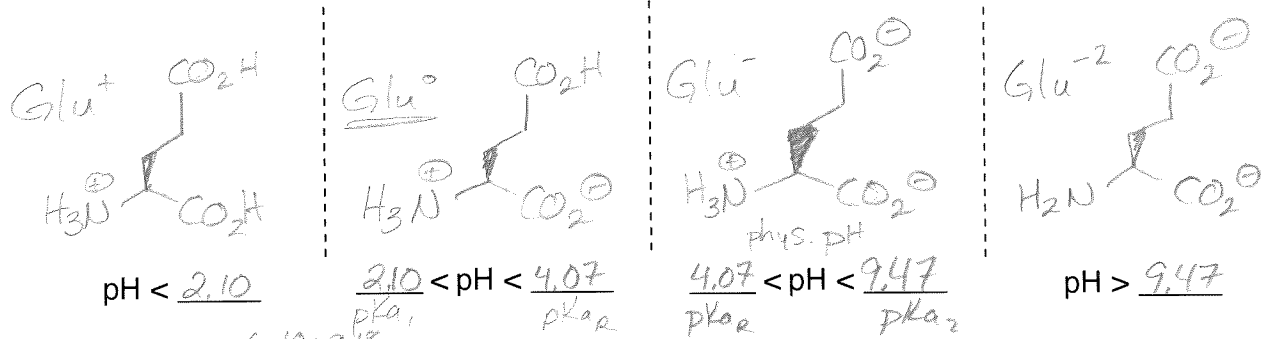


Arginine, $pI = \frac{2.01 + 12.48}{2} = 10.76$

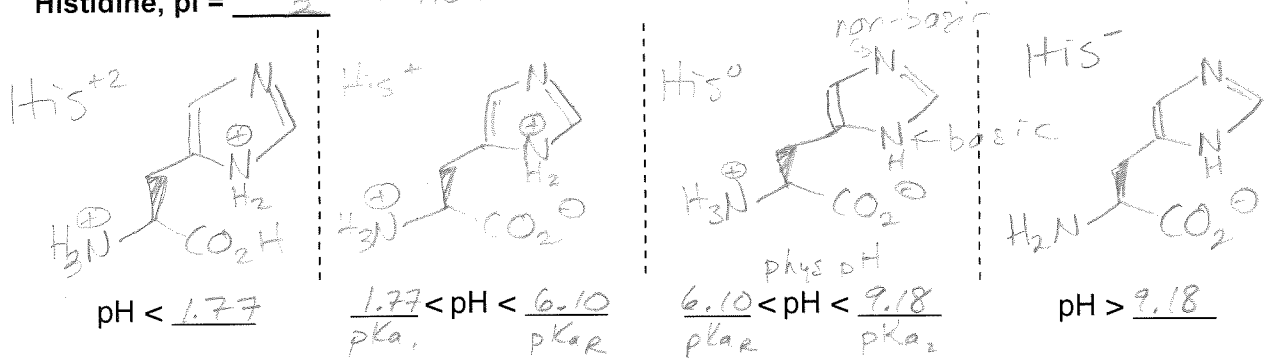


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Glutamic Acid, $pI = \frac{2.10 + 4.07}{2} = 3.08$



Histidine, $pI = \frac{6.10 + 9.18}{2} = 7.64$



(b) Determine the charge of the dominant ionic species for each amino acid at the indicated pH.

Amino Acid	pH 1	pH 5	pH 10	pI
Phe	+1	0	-1	5.91
Tyr	+1	0	-1	5.63
Arg	+2	+1	0	10.76
Glu	+1	-1	-2	3.08
Histidine	+2	+1	-1	7.64

(c) Indicate the position of each amino acid after two separate electrophoresis experiments. One experiment is performed at pH 6 and the other at pH 10.

Electrophoresis at pH 6

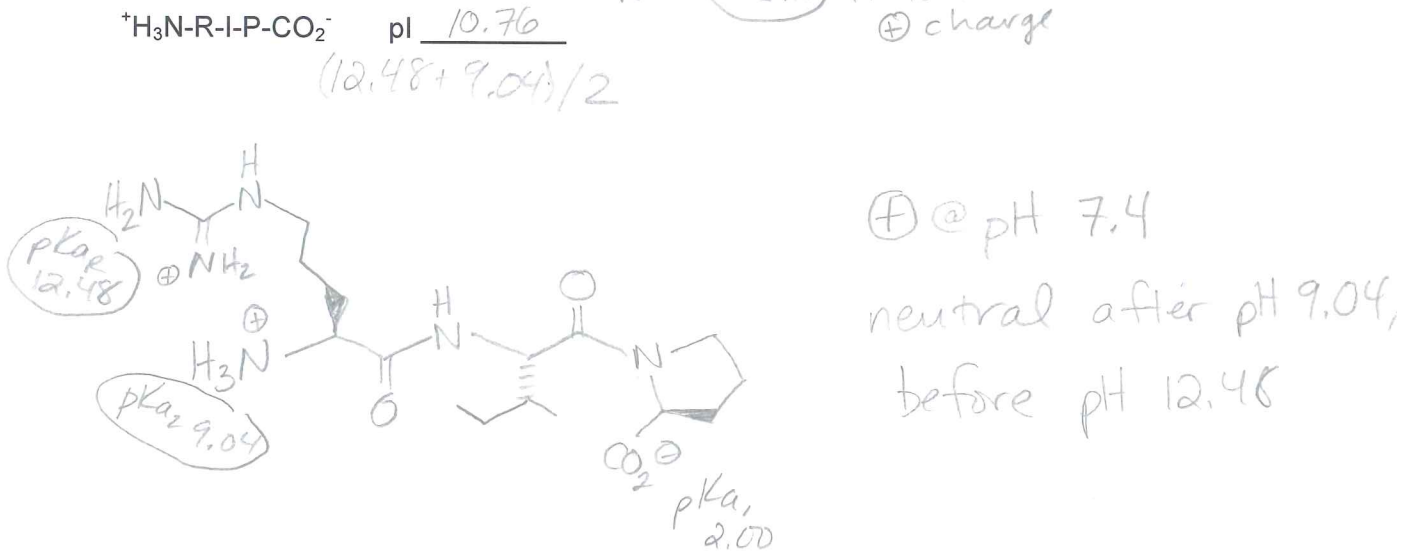
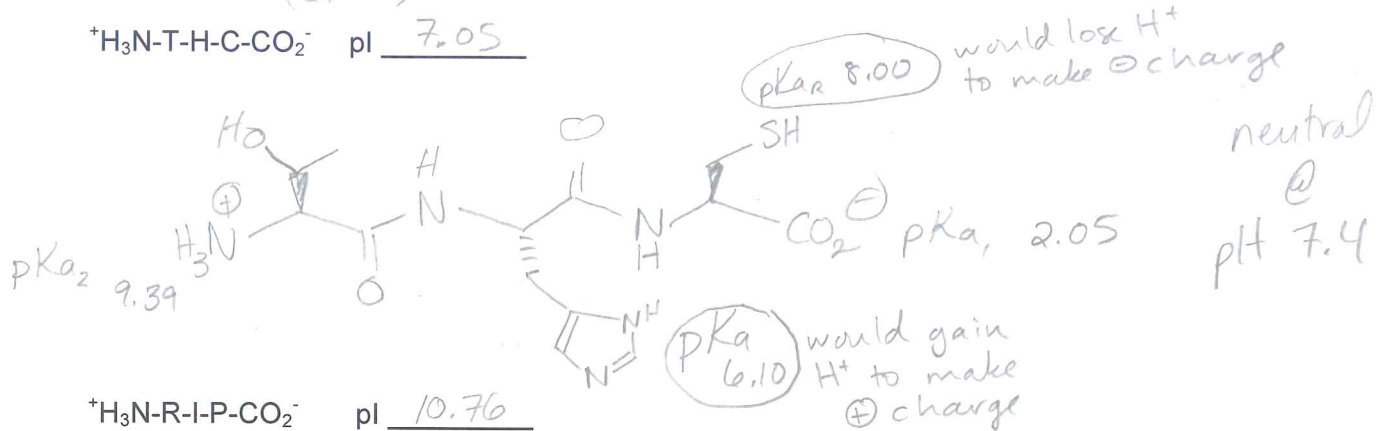
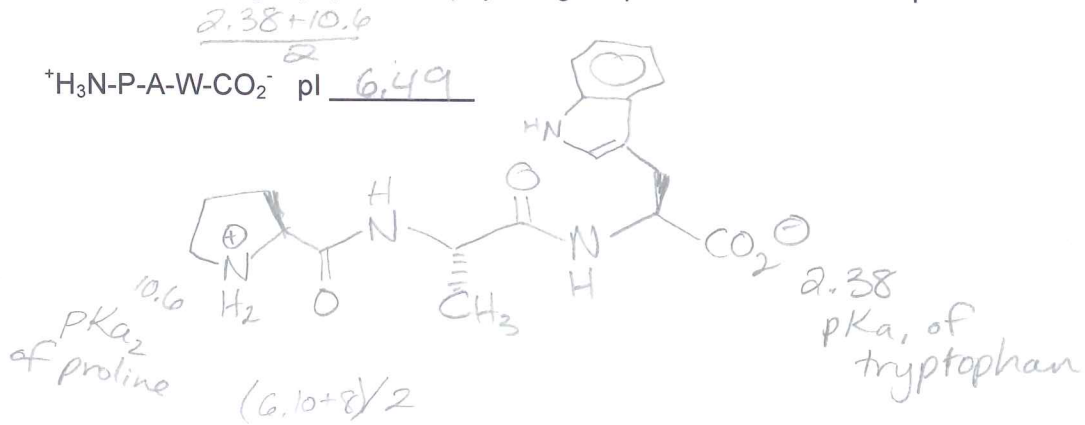


Electrophoresis at pH 10



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23. Draw the following tripeptides at physiological pH and determine the pI for each.



*Part 2 of Chapter 26 HW is in the McMurry text (synthesis).