CONCEPT: TITRATIONS OF AMINO ACIDS WITH IONIZABLE R-GROUPS

●Amino acids with ionizable R-groups have ____ inflection/equivalence points.

EXAMPLE: Titration Curve Review of Amino Acid with Ionizable R-Group.

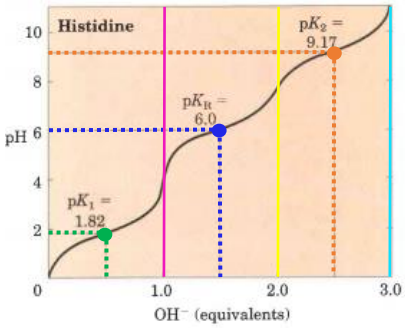
What does the **pink** line represent?
_____ point of _____ group. (No more COOH).

What does the **yellow** line represent?
_____ point of ___-group. (No more _____ R-group).

What do the **orange** dot & lines represent?
_____ & pK_a of _____ group.

What do the **blue** dot & lines represent?
_____ & pK_a of ___-group.

What do the **green** dot & lines represent?
_____ & pK_a of _____ group.



What does the **light blue** line represent?
_____ point of _____ group.
(No more NH_3^+).

What does the **black** curve represent?
_____ titration curve.

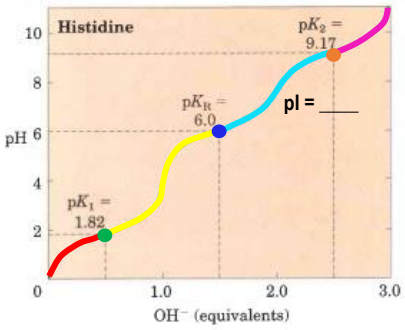
Drawing Amino Acids with Ionizable R-Groups from Titration Curves

●pI will always be equal to the equivalence point that allows the _____ of a net charge.

EXAMPLE: Draw the predominate structure of His at each colored region of its titration curve & calculate its pI.

pH < Carboxyl pK_a < pK_R < Amino pK_a

Net Charge = _____



Carboxyl pK_a < pK_R < Amino pK_a < pH

Net Charge = _____

Carboxyl pK_a < pH < pK_R < Amino pK_a

Net Charge = _____

Carboxyl pK_a < pK_R < pH < Amino pK_a

Net Charge = _____

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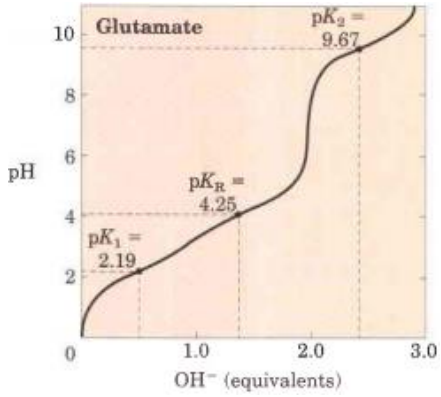
PRACTICE: A) Determine the pI of Glu & mark it on the provided titration curve.

a) 6.96

b) 5.93

c) 7.48

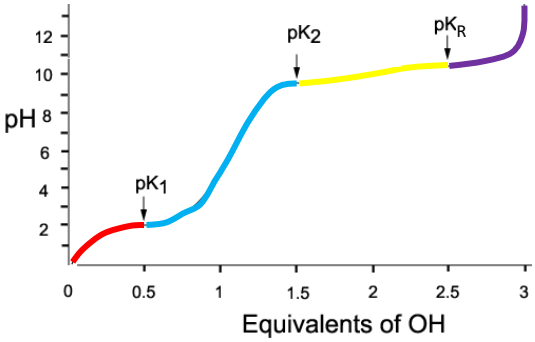
d) 3.22



B) Use the titration curve to draw the predominate structures of Glu at pH = 1.0, pH = 3.0, pH = 7.0, & pH = 11.0.

Glu at pH = 1.0 Glu at pH = 3.0 Glu at pH = 7.0 Glu at pH = 11.0

PRACTICE: Draw the predominate structures of K at the indicated sections of its titration curve. Mark the pI on the curve.



Red Blue Yellow Purple

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PRACTICE: Label each arrow on Asp's titration curve & draw its predominate structure at each colored region.

A) Amino group pK_a.

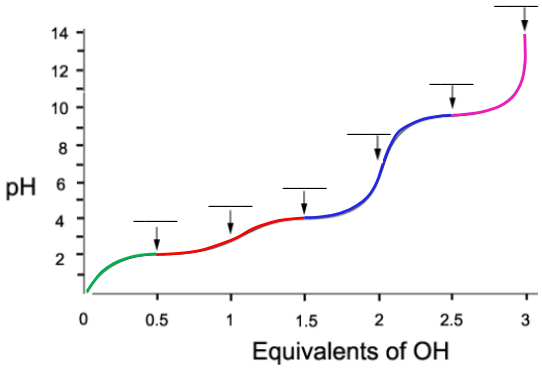
B) Carboxyl group pK_a.

C) R-group pK_a (pK_a = 3.9).

D) Amino group equivalence point.

E) Carboxyl group equivalence point.

F) R-group equivalence point.



Net Charge = _____

Net Charge = _____

Net Charge = _____

Net Charge = _____