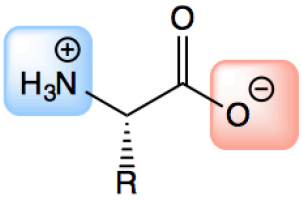
CONCEPT: ISOELECTRIC POINT

The ***isoelectric point*** (pI) is the pH at which an amino acid has _____ net charge (max zwitterion concentration).

- For a *generic* amino acid, the pI is calculated by taking the _____ of the two functional groups

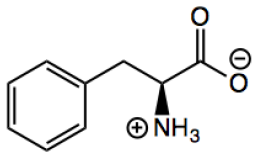
EXAMPLE: Propose an *approximate* isoelectric point for the following generic amino acid based on *approximate* pKa values



$$pI = \frac{\square + \square}{2}$$

Isoelectric Point of Non Acidic/Basic Amino Acids:

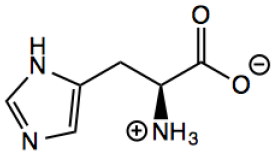
- Calculate as a generic amino acid. Look up exact pKa values and average.



Phenylalanine **(F)**

Isoelectric Point of Acidic/Basic Amino Acids:

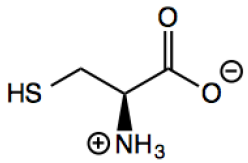
- Now there are three ionizable groups. Average the pKas that correspond with the two similar groups.



Histadine **(H)**

Isoelectric Point of Cysteine:

- An exception: Non-acidic/basic, however you average –S/-O



Cysteine (C)

CONCEPT: ISOELECTRIC POINT

PRACTICE 1: Calculate the isoelectric point of tyrosine (Y)

PRACTICE 2: Calculate the isoelectric point of glutamic acid (E)