CONCEPT: ISOELECTRIC POINT

●_____ *point* (*pI*): exact ____ at which a molecule has *no net charge* (+ & **-** balanced means net charge = ____).

●pI is always the midpoint between the _____ pK_a's for the _____ ionizations involving the *neutral* species.

□ More acidic amino acids have more acidic ____ values.

□ When pH = pI of a molecule, the molecule will _____ migrate in an electric field.

□ pI is a useful property in _____: the separation of net-charged-proteins with an electric field.

pI of Amino Acids with Non-Ionizable R-groups

●*Isoelectric point* can be easily calculated using the _____ values of a molecule.

□ Amino acid pI is simply the _____ of the appropriate *two* pK_a values.

Isoelectric Point

$$pI = \frac{pK_{a1} + pK_{a2}}{2}$$

EXAMPLE: Calculate the isoelectric point of Val. pK_{a1} = 9.62. pK_{a2} = 2.32.

a) 7.23
b) 7.3
c) 5.97
d) 11.94

PRACTICE: Draw the structure of Leu and determine its pI. pK_{a1} = 9.6. pK_{a2} = 2.4.

a) 7.59
b) 6.0
c) 3.91
d) 5.5

PRACTICE: At any pH below the pI, the population of amino acids in solution with non-ionizable R-groups will have:

a) a net negative charge.
b) a net positive charge.
c) no charged groups.
d) no net charge.
e) positive and negative charges in equal concentrations.