

Q1. A given amino acid has the following pKa values : α -COOH = 2.15 , α -NH₃⁺ = 8.95 , and side chain (RH⁺) = 10.53. then its PI Value is :

$$pK_{a1} + pK_{a2}$$

2

$$10.53 + 8.95$$

2

- a) 7.21
b) 5.55
c) 6.34
d) 9.74

Q2. Which of the following is a pentapeptide?

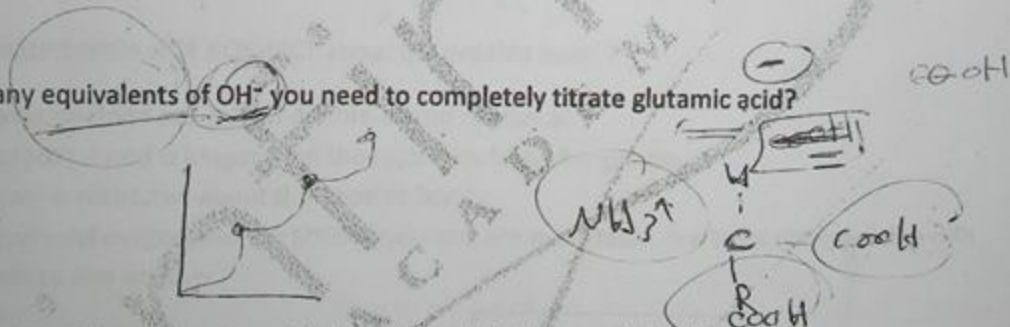
- a) Carnosine.
b) Glutathione.
c) Oxytocin.
d) Enkephalin.

Q3. What is the net charge on the peptide : phe-Glu-Lys-Met at pH12?

- a) Zero
b) +1
c) -2
d) +2

Q4. How many equivalents of OH⁻ you need to completely titrate glutamic acid?

- a) 1
b) 2
c) 3
d) 4



Q5. Which of the following amino acids has hydrophobic (non-polar) side chain ?

- a) Leu
b) Glu
c) Cys
d) Ser

Q6. During titration with a strong base glutamine can exist in :

- a) One ionic form
b) Two ionic forms
c) Three ionic forms
d) Four ionic forms

Q13. The isoelectric point of an amino acid is the point at which the molecule:

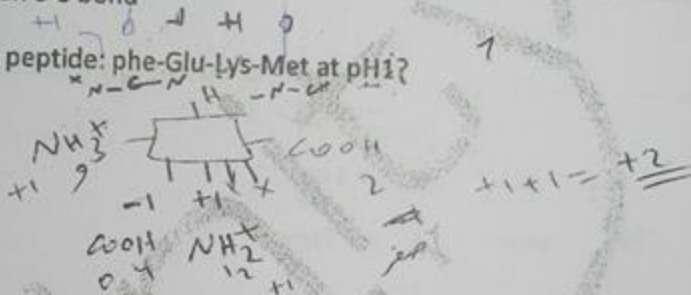
- a) Is polar with overall zero charge
- b) Is polar with overall negative charge
- c) Is polar with an overall positive charge
- d) Is nonpolar

Q14. Which of the following statements about glutathione is NOT CORRECT?

- a) It contains a gamma-glutamyl residue
- b) It acts as an oxidizing agent in the cell
- c) The reduced form has a -SH group
- d) The oxidized form contains an S-S bond

Q15. What is the net charge on the peptide: phe-Glu-Lys-Met at pH 1?

- a) Zero
- b) +1
- c) -1
- d) +2



Q16. Which statement is NOT CORRECT about the peptide bond?

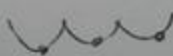
- a) The peptide bond has partial double-bond character
- b) The peptide bond is longer than the typical carbon-nitrogen bond
- c) Rotation is restricted about the peptide bond
- d) The carbonyl oxygen and the amide hydrogen are most often in a *trans* configuration with respect to one another

Q17. For a given amino acid the pKa of the alpha COOH group:

- a) Is higher than the pKa of the alpha , -NH3+ group
- b) Is lower than the pKa of the alpha , -NH3+ group
- c) Equals to the pKa of the alpha , -NH3+ group
- d) Equals to the PI

Q18. How many inflection points are there in the titration curve of histidine?

- a) 1
- b) 2
- c) 3
- d) 4



Q19. Which of the following amino acids has a $-CONH_2$ group in its side chain?

- a) Glutamine ✓
- b) Glutamic acid
- c) Tyrosine
- d) Lysine

Q20. Which of the following amino acids is not chiral ?

- a) Proline
- b) Glycine
- c) Alanine
- d) Lysine

Q21. Which of the following amino acids is a precursor of Thyroxine?

- a) Tryptophan
- b) Threonine
- c) Tyrosine
- d) Lysine

$pH < 7 \rightarrow +$
 $pH = 7 \rightarrow$ كلف
 $pH > 7 \rightarrow -$

Q22. Which of the following is a tripeptide?

- a) Carnosine
- b) Glutathione
- c) Oxytocin
- d) Enkephalin

$-2 \quad pH > 7$

Q23. what is the net charge on the peptide: Trp-His-Asp-Ala at pH 12?

- a) Zero
- b) +1
- c) -1
- d) -2

$NA_3^+ +1$
 $COOH -1$
 $COOH -1$
 $COOH -1$
 $COOH -1$
 $-1 -1 -1 -1 = -4$
 $+1 -4 = -3$
 -2
 $-1 -1 -1 = -3$
 $-3 +1 = -2$

Q24. How many inflection points are there in the titration curve of alanine?

- a) 1
- b) 2
- c) 3
- d) 4

Q25. Which of the following amino acids is a precursor of Thyroxine?

- a) Tryptophan
- b) Threonine
- c) Tyrosine
- d) Lysine

Q26. Which of the following amino acid pairs are polar?

- a) Val and Asp
- b) Arg and Glu
- c) Leu and Met
- d) Ile and Lys

Q27. During titration with a strong base asparagine can exist in :

- a) One ionic form
- b) Two ionic forms
- c) Three ionic forms
- d) Four ionic forms

Q28. Which of the following amino acids has hydrophobic (non-polar) side chain ?

- a) Val
- b) Glu
- c) Cys
- d) Ser

Q29. Which of the following amino acids is uncommon?

- a) Phenylalanine
- b) Tyrosine
- c) Valine
- d) Thyroxine

Q30. Which of the following is a hydrophobic substance?

- a) Alanine
- b) Ethanol
- c) Sucrose
- d) Benzene

Q31. The hydroxyl group in hydroxyproline occurs at the :

- a) γ carbon
- b) δ carbon
- c) α carbon
- d) β carbon

Q32. Oxidized glutathione contains:

- a) two peptide bonds
- b) four peptide bonds
- c) six peptide bonds
- d) three peptide bonds .

Q33. What is the net charge on the tripeptide :Glu-Asp-Val at pH 7.0, if the pKa of NH₂ terminal = 10.1 and -COOH terminal = 2.3 ?

- a) 0
- b) -1
- c) -2
- d) +1

Q34. Which of the following is a small peptide?

- a) Insulin
- b) Alpha-Keratin
- c) Oxytocin
- d) Ribonuclease A

Q35. The peptide bond is planar as a result of :

- a) Presence of free N-terminal
- b) Resonance stabilization
- c) Presence of alpha-carbon atom
- d) Tertiary structure of the peptide

Q36. Which of the following amino acids has hydrophobic (non-polar) side chain ?

- a) Ala
- b) Glu
- c) Cys
- d) Ser

Q37. Which of the following amino acids does not occur in proteins?

- a) L-phenylalanine
- b) L-tyrosine
- c) L-Valine
- d) L-ornithine

Q38. Which of the following is a hydrophobic substance?

- a) Alanine
- b) Ethanol
- c) Sucrose
- d) Hexane

Q39. Which of the following is a hydrophilic substance?

- a) Hexane
- b) Acetone
- c) Fatty acid
- d) Cholesterol

Q40. Which of the following statement is correct about the dipeptide carnosine?

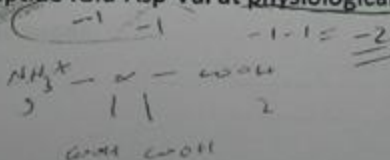
- a) It is manufactured as a drug
- b) It is composed of beta-Alanine-L-Histidine
- c) It is composed of alpha-Alanine-L-Histidine
- d) It is composed of beta-Alanine-D-Histidine

Q41. Glutathione is an important scavenger of oxidizing agents because it contains:

- a) Gly
- b) Cys
- c) Glu
- d) Met

Q42. What is the net charge on the tripeptide :Glu-Asp-Val at physiological pH if the pKa of NH₂ terminal = 10.1 and -COOH terminal = 2.3 ?

- a) 0
- b) -1
- c) -2
- d) +1



pH = 7

B-

Q43. Amino acids have the zwitterionic structure:

- a) At their pI
- b) At very high pH
- c) When the molecule carries a net negative charge
- d) When the molecule carries a net positive charge

Q44. Which of the following amino acids has hydrophobic (non-polar) side chain ?

- a) Ile
- b) Glu
- c) Cys
- d) Ser

Q45. During titration with a strong base Lysine can exist in :

- a) One ionic form
- b) Two ionic forms
- c) Three ionic forms
- d) Four ionic forms

Q46. Reduced glutathione contains:

- a) two peptide bonds ✓
- b) four peptide bonds
- c) six peptide bonds
- d) three peptide bonds

Q47. What is the net charge on the tripeptide :Gln-Asp-Val at pH 11.0, if the pK_a of NH_2 terminal = 10.1 and $-COOH$ terminal = 2.3 ?

- a) 0
- b) -1
- c) -2
- d) +1

Q48. Which of the following is a peptide hormone:

- a) Enkephalin
- b) Alpha-Keratin
- c) Oxytocin
- d) Ribonuclease A

Q49. Which of the following amino acids is optically inactive?

- a) Threonine
- b) Glycine *optically inactive*
- c) Alanine
- d) Lysine

Q50. Which of the following amino acids is aromatic?

- a) Proline
- b) Serine
- c) Tyrosine *aromatic*
- d) Arginine

Q51. A given amino acid has the following pKa values: α -COOH=2.18, α -NH₃⁺=8.95, and side chain = 10.53. Then its PI value is:

- a) 5.56
- b) 9.74 ✓
- c) 7.22
- d) 6.36

Q52. Which of the following is a tripeptide?

- a) Carnosine
- b) Glutathione ✓
- c) Oxytocin
- d) Enkephalin

Q53. What is the net charge on the peptide : Phe-Glu-Lys-Met at pH7?

- a) Zero ✓
- b) +1
- c) -1
- d) +2

Handwritten calculation for Q53:
 Phe: +1
 Glu: -1
 Lys: +1
 Met: -1
 Total: +1 - 1 + 1 - 1 = 0
 pH = 7
 Net charge = 0

Q54. how many equivalents of OH⁻ you need to completely titrate asparagines?

- a) 1
- b) 2
- c) 3
- d) 4

Q55. Which of the following is a cyclic amino acid with secondary nitrogen atom?

- a) Proline
- b) Phenylalanine
- c) Tyrosine
- d) Tryptophane

Q56. which of the following amino acid is achiral?

- a) Proline
- b) Glycine
- c) Alanine
- d) Lysine

Q57. an antibiotic peptide is:

- a) Glutathione
- b) Gramicidin S
- c) Enkephalin
- d) Oxytocin

Q58. Glutathione is an important scavenger of oxidizing agents because it contains:

- a) Gly
- b) Cys
- c) Glu
- d) Met

Q59. Which amino acids contain sulfur?

- a) Cysteine and lysine
- b) Cysteine and methionine
- c) Arginine and methionine
- d) Cysteine and Isoleucine

Q60. For a given amino acid the pKa of the alpha -NH₃⁺ group:

- a) Is higher than the pKa of the alpha, -COOH group
- b) Is lower than the pKa of the alpha, -COOH group
- c) Equals to the pKa of the alpha, -COOH group
- d) Equals to the PI

Q61. What is the net charge on the peptide : Phe-His-Asp-Lys at pH12?

- a) Zero
- b) +1
- c) -2
- d) +2

Q62. A given amino acid has the following pKa values: α -COOH=2.15, α -NH₃⁺= 8.95, and side chain(RH) = 3.85. Then its PI value is:

- a) 5.55
- b) 3.00
- c) 4.98
- d) 6.40

Q63. Which of the following is a dipeptide?

- a) Carnosine
- b) Glutathione
- c) Oxytocin
- d) Enkephalin

Q64. What is the net charge on the peptide : Phe-Glu-Lys-Met at pH1?

- a) Zero
- b) +1
- c) -1
- d) +2

Q65. which of the following amino acids has one isomer?

- a) Threonine
- b) Glycine
- c) Alanine
- d) Lysine

Q66. Which of the following amino acid is aromatic?

- a) Proline
- b) Serine
- c) Tyrosine
- d) Arginine

Question	Answer	Question	Answer	Question	Answer
1	D	23	D	45	D
2	D	24	B	46	A
3	C	25	C	47	C
4	C	26	B	48	C
5	A	27	C	49	B
6	C	28	A	50	C
7	A	29	D	51	B
8	B	30	D	52	B
9	D	31	A	53	A
10	C	32	B	54	B
11	B	33	C	55	A
12	C	34	C	56	B
13	A	35	B	57	B
14	B	36	A	58	B
15	D	37	D	59	B
16	B	38	D	60	A
17	B	39	B	61	C
18	C	40	B	62	B
19	A	41	B	63	A
20	B	42	C	64	D
21	C	43	A	65	B
22	B	44	A	66	C