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(Most Important Questions On Protein)

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Sahi Prep Hai Toh Life Set Hai

Q1. Match the COLUMN A with COLUMN B-

COLUMN A (Protein type)	COLUMN B (Prosthetic group)
a. chromoprotein	i. carbohydrate
b. metalloprotein	ii.coloured molecule
c. mucoprotein	iii. metallic compound

A. a-ii, b-iii, c- i

B. a-i, b-iii, c- ii

C. a-iii, b-ii, c- i

D. a-ii, b-i, c- iii

Q2. The isoelectric point of a protein is defined as-

A. the pH at which all groups are charges

B. the pH at which net charge on protein is zero

C. the pH at which all groups are uncharged

D. the pH at which acidic group is protonated and basic group is unprotonated

Q3. Match the COLUMN A with COLUMN B-

COLUMN A (Protein type)	COLUMN B (Examples)
a. catalytic protein	i. collagen and elastin
b. regulatory protein	ii. enzymes
c. structural protein	iii. complement protein
d. defense protein	iv. hormones

A. a-ii, b-iv, c-i, d-iii

B. a-i, b-iii, c- ii, d-iv

C. a-iii, b-ii, c-i, d-iv

D. a-ii, b-i, c- iii, d-iv

Q4. If the average molecular mass of one amino acid is 128 then what will be the molecular weight of a polypeptide chain having 20 amino acid?

A. 938

B. 1100

C. 876

D. 744

Q5. A bond generally absent in cytosolic proteins but present in extracellular proteins is known as-

A. Hydrogen bond
B. Hydrophillic bond
C. Ionic bond
D. Disulphide bond

Q6. Membranes have transmembrane protein which passes through the membrane. The transmembrane domain of these proteins is present in which predominant form?

A. Alpha-helix
B. Beta-sheet
C. Linear sheets
D. None

Q7. A polypeptide chain is fused with yellow fluorescent protein (YFP) which has molecular mass 17 kDa. The length of protein A is 100 amino acids. What will be molecular mass of fusion protein in daltons?

A. 13700
B. 11000
C. 12500
D. 13300

Q8. If one isloleucine molecule has a weight of 124 daltons, then what will be the molecular mass in daltons of a peptide chain consisting of 24 arginine residues.

A. 2544
B. 1943
C. 3356
D. 7243

Q9. Given below are some amino acid sequences of peptide chain. Which of the following will be easily detected by absorbance at 280 nm?

P. Tyr - Le - Ala - Met - Glu

Q. Leu - Val - Trp - Thr - Ile - Ser

R. Glu - Ala - Asp - Gin - Lys - Asp - Ser

S. Val - Tyr - Trp - Thr - Ile

A. P and S

B. P, Q and S

C. Q and S

D. Q and R

Q10. The predominant ionic form of amino acids in a solution primarily depends on the pH value. What will be the value of isoelectric point of a polypeptide chain if the Pk_1 = 3.1, Pk_2 = 2.25 and Pk_3 = 7.67?

A. 2.67
B. 2.98
C. 1.67
D. 4.66
Answers:
1.A

2.B

3.A

4.B

5.D

6.A

7.A

8.A

9.B

10.A

SOLUTION

Solution-1

COLUMN A (Protein type)	COLUMN B (Prosthetic group)
a. chromoprotein	ii.coloured molecule
b. metalloprotein	iii. metallic compound

c. mucoprotein	i. carbohydrate

Solution-2 The pH at which protein has no net charge is termed as its isoelectric point. At isoelectric point, amino acids are generally electrophoretically non-mobile and least soluble.

It is calculated by taking average of pK_1 and Pk_2 values of amino acids i.e.

Isoelectric point = $pK_1 + Pk_2 /2$

Hence, B is the correct option.

Solution-3

COLUMN A (Protein type)	COLUMN B (Examples)
a. catalytic protein	ii. enzymes
b. regulatory protein	iv. hormones
c. structural protein	i. collagen and elastin
d. defense protein	iii. complement protein

Solution-4 The molecular weight of polypeptide chain is calculated by using given below formula-

Molecular mass of oligopeptide (M) = n x (128- 18) (molecular weight of 1 amino acid)

18 is subtracted from 128 because water molecule is removed with formation of every peptide bond.

where n = number of amino acids

Hence, M = 20 x (128-18)

= 20x 110

= 2200

Solution-5 A bond generally absent in cytosolic proteins but present in extracellular proteins is known as disulphide bond. It is absent in cytosol because it has generally reducing environment whereas extracellular milieu has an oxidising environment. This bond is formed by oxidation of thiol group and requires an oxidising environment. Hence, D is the correct option.

Solution-6 Transmembrane proteins are generally extended on both sides of the membrane and they are predominantly present in alpha helices or clusters of helices also known as the helical bundle. Whereas, few proteins are also present as beta barrel which of beta sheets that rolls up into a tube like shape. Hence, A is the correct option.

Solution-7 The molecular mass of protein A (in daltons) is calculated by multiplying number of residues with mass of 1 amino acid which comes out to be = 100 x 110

= 1100 Da

The molecular mass of protein A (in daltons) fused with YFP = 11000 Da + 17000 Da

= 18100 Da

Hence, A is the correct option.

Solution- 8 In this, during the formation of peptide chain having 24 arginine residues, 24 peptide bonds will be formed through the release of 38 water molecules.

Thus, molecular mass of peptide chain will be = (24 x 124) – (24 x 18)

= 2544 Da

Hence, A is the correct option.

Solution-9 The amino acid sequence which contains aromatic amino acids which includes tryptophan, phenylalanine and tyrosine can be easily detected by absorbance at wavelength 280 nm. Absorbance at wavelength- 280 nm is usually used for detection and quantification of purified proteins. The absorbance of polypeptide chain depends on the number and positions of its aromatic amino acid residues. Hence, B is correct option.

Solution- 10 The pH at which molecule has no net charge is known as isoelectric point.

It is calculated by using formula = $pK_1 + Pk_2/2$

Given in question, $Pk_1 = 3.1$ and pK_2 is 2.25

Hence, by applying formula it is calculated by taking average of 3.1 and 2.25 (pk_{a1} and pk_{a2}) which comes out to be 2.675.

Thus, A is the correct option.

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