1. Match List I and List II

List I Vitamin		List II Deficiency disease	
A	Vitamin A	I	Beri-Beri
B	Thiamine	II	Cheilosis
C	Ascorbic acid	III	Xerophthalmia
D	Riboflavin	IV	Scurvy

Choose the correct answer from the options given below

[2023 (06 Apr Shift 1)]

(1) A – III, B – I, C – IV, D – II

(2) A – IV, B – I, C – III, D – II

(3) A – IV, B – II, C – III, D – I

(4) A – III, B – II, C – IV, D – I

2. Match List-I with List-II.

	List-I Natural Amino acid		List-II One Letter Code
(A)	Arginine	(I)	D
(B)	Aspartic acid	(II)	N
(C)	Asparagine	(III)	A
(D)	Alanine	(IV)	R

Choose the correct answer from the options given below:

[2023 (06 Apr Shift 2)]

(1) (A)–IV, B–I, (C)–II, (D)–III

(2) (A)–I, B–III, (C)–IV, (D)–II

(3) (A)–III, B–I, (C)–II, (D)–IV

(4) (A)–IV, B–I, (C)–III, (D)–II

3. Sulphur (S) containing amino acids from the following are:

(a) isoleucine

(b) cysteine

(c) lysine

(d) methionine

(e) glutamic acid

[2023 (08 Apr Shift 1)]

(1) b, c, e

(2) a, b, c

(3) b, d

(4) a, d

4. Match List I with List II

	List I **Natural amino acid**		**List II** **One Letter Code**
(A)	Glutamic acid	(I)	Q
(B)	Glutamine	(II)	W
(C)	Tyrosine	(III)	E
(D)	Tryptophan	(IV)	Y

Choose the correct answer from the options given below:

[2023 (08 Apr Shift 2)]

(1) (A)-III, B-IV, (C)-I, (D)-II

(2) (A)-IV, B-III, (C)-I, (D)-II

(3) (A)-III, B-I, (C)-IV, (D)-II

(4) (A)-II, B-I, (C)-IV, (D)-III

5. The one that does not stabilize 2° and 3° structures of proteins is

[2023 (10 Apr Shift 1)]

(1) $-S-S-$linkage

(2) H−bonding

(3) $-O-O-$linkage

(4) van der Waals forces

6. In an oligopeptide named Alanylglycylphenyl alanyl isoleucine, the number of sp^2 hybridised carbons is _____.

[2023 (12 Apr Shift 1)]

7. The naturally occurring amino acid that contains only one basic functional group in its chemical structure is

[2023 (13 Apr Shift 2)]

(1) asparagine

(2) histidine

(3) arginine

(4) lysine

8. Which is not true for arginine?

[2023 (15 Apr Shift 1)]

(1) It has a fairly high melting point

(2) It is associated with more than one pK_a values.

(3) It has high solubility in benzene.

(4) It is a crystalline solid.

ANSWER KEYS

1. (1) **2.** (1) **3.** (3) **4.** (3) **5.** (3) **6.** (10) **7.** (1) **8.** (3)

1. (1)

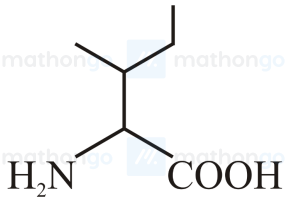
Vitamin A Deficiency: Xerophthalmia: With this condition, the eyes may become very dry and crusted, which may damage the cornea and retina.
Thiamine Deficiency: Beriberi is a disease in which the body does not have enough thiamine (vitamin B1).
Scurvy is a disease caused by a serious vitamin C(Ascorbic acid) deficiency
Riboflavin deficiency is often associated with cheilosis (chapping and fissuring of the lips). Riboflavin Deficiency. Riboflavin deficiency can be associated with various developmental abnormalities, including cleft lip.

2. (1)

The single letter amino acid codes is fairly easy to remember. In eleven cases out of twenty, it is just the first letter.

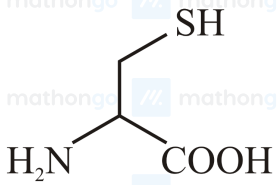
	Natural Amino acid		One Letter Code
(A)	Arginine	(IV)	R
(B)	Aspartic acid	(I)	D
(C)	Asparagine	(II)	N
(D)	Alanine	(III)	A

3. (3)



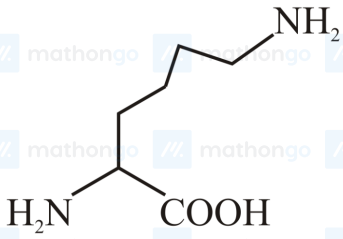
Isoleucine -

Isoleucine is a neutral amino acid.



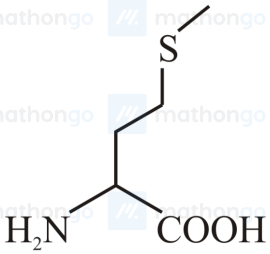
Cysteine -

Cysteine is a sulphur containing amino acid. It contain thiol group.



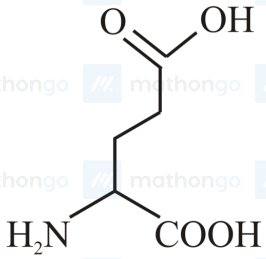
Lysine -

Lysine is a basic amino acid.



Methionine -

Methionine is a sulphur containing amino acid contain thioether group.



Glutamic acid -

Glutamic acid is an acidic amino acid.

4. (3)

Amino acids are organic compounds that contain amine and carboxyl functional groups, as well as a side chain specific to each amino acid. There are 20 standard amino acids that are used to create proteins.

One letter codes of the given natural amino acids are

Natural amino acid	One Letter Code
(A) Glutamic acid	(III) E
(B) Glutamine	(I) Q
(C) Tyrosine	(IV) Y
(D) Tryptophan	(II) W

$\therefore$ Correct match is

(A)-III, B-I, (C)-IV, (D)-II

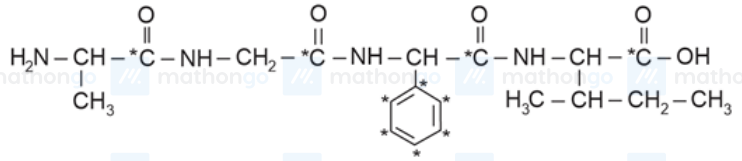
5. (3)

Secondary structure of protein refers to local folded structures that form within a polypeptide due to interactions between atoms of the backbone. They are found to exist in two different types of structures $\alpha-$ helix and $\beta-$ pleated sheet structures. This structure arises due to the regular folding of the backbone of the polypeptide chain due to hydrogen bonding between $-$ CO group and $-$ NH groups of the peptide bond. Tertiary Structure of Protein arises from further folding of the secondary structure of the protein. H-bonds, electrostatic forces, disulphide linkages, and Vander Waals forces stabilise this structure. The tertiary structure of proteins represents overall folding of the polypeptide chains, further folding of the secondary structure.

6. (10)

An oligopeptide is a short-chain peptide. The given oligopeptide is a tripeptide.

The given Oligopeptide has the following structure

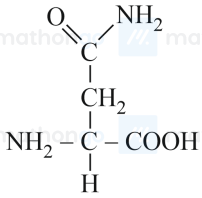


In sp^2 hybridisation carbon can have one pi bond. The carbons marked with * are sp^2 carbons

It has 10 sp^2 hybridised C atoms.

7. (1)

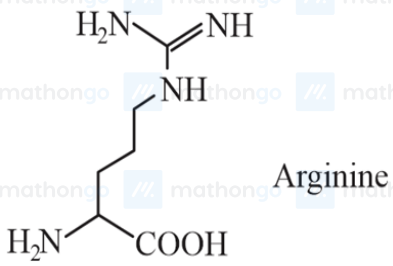
Asparagine have only one basic functional Group Structure of Asparagine:



There are three amino acids that have basic side chains at neutral pH. These are arginine (Arg), lysine (Lys), and histidine (His). Their side chains contain nitrogen and resemble ammonia, which is a base. Their pKa's are high enough that they tend to bind protons, gaining a positive charge in the process.

8. (3)

In aqueous solutions carboxyl group can lose protons and the amino group can accept a proton thus giving rise to a dipolar known as zwitter ion. Due to this dipolar behaviour they have strong electrostatic interactions within them. For this reason melting point of amino acids is high. It has more than one basic groups amine and guanidine, hence it has two pKa values. It is crystaline solid



Arginine

Since arginine is polar, it is not soluble in benzene.