

1. The β -pleated sheet forms when two or more peptide chain, called strands, line up side by side with the C=O and N-H bonds in the plane of the sheets
 - A. true
 - a. false
2. when the amino acid alanine (the R group is -CH₃) is added to a solution with a pH of 7.3 alanine become
 - A. zwitterion
 - B. nonpolar
 - C. cation
 - D. anion
3. the α amino acid have a carboxyl group with a pK around _____ and an amino group with a pK near _____ :
 - A. 1.1, and 12.1
 - B. 6.5, and 8.0
 - C. 3.3, and 10.5
 - D. 2.2, and 9.4
4. an amino acid can act as an acid and a base
 - A. true
 - B. false
5. In an aqueous solution, protein conformation is determined by two major factors. One is the formation of the maximum number of hydrogen bonds. The other is the
 - A. formation of the maximum number of hydrophilic interactions
 - B. Placement of hydrophobic amino acid residues within the interior of the protein
 - C. Minimization of entropy by the formation of a water solvent shell around the protein
 - D. Maximization of ionic interactions
6. Calculate the isoelectric point of aspartic acid
pK₁ -COOH = 2.01
pK₂ -NH₃⁺ = 9.8
pK₃ -R group = 3.83
 - A. 5.9
 - B. 2.92
 - C. 8.62
 - D. 6.82
7. What is a peptide bond
 - A. Bond that holds two amino acids together
 - B. Bond that holds the phosphate group of one nucleotide and a sugar of a neighboring nucleotide
 - C. A bond that is formed by the sharing of electrons
 - D. A bond that holds hydrogen and oxygen molecules together

8. Calculate the PI of lysine
pK1 -COOH = 2.2
pK2 -NH₃⁺ = 9.0
pK3 -R group = 10.5
- A. 9.75
 - B. 3.65
 - C. 6.35
 - D. 5.6
9. The β -pleated sheet arrangement of a protein is favored by amino acids with small side chains
- A. True
 - B. False
10. Amino acids with an additional COOH group in the side chain are classified as acidic amino acids
- A. True
 - B. False
11. The chain of amino acids folds and coils on itself
- A. Tertiary
 - B. Quaternary
 - C. Primary
 - D. Secondary
12. Myoglobin and the subunits of hemoglobin have
- A. Very different primary and tertiary structures
 - B. Very similar primary structures, but different tertiary structures
 - C. Very similar primary and tertiary structures
 - D. No obvious structural relationship
 - E. Very similar tertiary structure, but different primary structures
13. Native state of a protein can be disrupted by
- A. Temperature
 - B. Removal of water
 - C. pH
 - D. All of the above
14. Which of the following statement is false?
- A. Secondary structure of a protein determines how it folds up into a unique three-dimensional structure
 - B. Three-dimensional structure of a protein determines the function of a protein
 - C. Amino acid sequence is absolutely invariant for a particular protein
 - D. Primary structure of a protein determines how it folds of into a unique three-dimensional structure

15. Calculate the isoelectric point of arginine
pK1 -COOH =2
pK2 -NH3 =9.0
pK3 -R group =13.2
- A. 5.5
 - B. 7.6
 - C. 5.12
 - D. 11.1
16. The amino acid aspartic acid and glutamic acid have a +1 net charge at low pH, and a -2 net charge at high pH
- A. True
 - B. False
17. Which of the following are known as helix breakers
- A. Threonine
 - B. Valine
 - C. Proline and glycine
 - D. Isoleucine and leucine
18. By convention, the C-terminal amino acid is always written at the right end of the peptide chain and the N-terminal amino acid at the left
- A. True
 - B. False
19. The main bonding in the secondary structure of a protein is due to
- A. Covalent bonding
 - B. Hydrogen bonding
 - C. Ionic bonding
 - D. Polar bonding
20. The isoelectric point of an amino acid is defined as
- A. The pH where the amino group is unchanged
 - B. The pH where the molecule carries no net electric charge
 - C. The pH of maximum electrolytic mobility
 - D. The pH where the carboxyl group is unchanged
21. all of the following are considered weak interactions in proteins, except
- A. Hydrogen bonds
 - B. Peptide bonds
 - C. Ionic bonds
 - D. Hydrophobic interactions
22. Two or more polypeptides attached together and work as one unit
- A. Secondary
 - B. Primary
 - C. Tertiary
 - D. Quaternary

23. Which of the following does not affect the stability of a α -helix
- A. Bulkiness
 - B. Occurrence of alanine and glycine residues N-acetyl muramic acid
 - C. Electrostatic repulsion
 - D. Interaction between R groups spaced three residues apart
24. Acidic amino acids have lower pI values than basic amino acids
- A. True
 - B. False
25. Which of the following is false
- A. α helix is a right-handed coiled strand
 - B. The two main types of secondary structure are the α helix and β pleat structures
 - C. The hydrogen bonding in a β -sheet is within strands rather than between strands
 - D. The hydrogen bonding in a β -sheet is between strands rather than within strands
26. Tertiary conformation of proteins is maintained by 3 types of bond namely, ionic, hydrogen and
- A. Peptide
 - B. Covalent
 - C. Disulfide
 - D. Sulfide
27. The entire polypeptide forms a three-dimensional structure
- A. Secondary
 - B. Primary
 - C. Tertiary
 - D. Quaternary
28. the coiled peptide chain held in place by hydrogen bonding between peptide bonds in the same chain...
- A. β -pleated sheet
 - B. α -helix
 - C. Primary structure
 - D. Tertiary structure
29. The hydrolysis of the amino bonds in a protein forms the individual amino acids that comprise the primary structure
- A. True
 - B. False
30. The tertiary structure folding in protein is primary due to the interactions of
- A. The 'A' groups
 - B. The 'R' groups
 - C. The 'P' groups
 - D. The 'S'
31. In the alpha helix the hydrogen bonds
- A. Occur mainly between electronegative atoms of the R groups
 - B. Are roughly parallel to the axis of the helix
 - C. Are roughly perpendicular to the axis of the helix
 - D. Occur only between some of the amino acids of the helix

32. Which of the following bonds are not involved in tertiary type of protein structure
- A. **Hydrophilic interactions**
 - B. Disulfide bond
 - C. Hydrogen bonding
 - D. Salt bridges
33. A sequence of amino acids in a certain protein is found to be -Ser-Gly-Pro-Gly. The sequence is ___ structure
- A. Secondary
 - B. Quaternary
 - C. Tertiary
 - D. **Primary**
34. Which of the following is first determined as oligomer
- A. Collagen
 - B. **Hemoglobin**
 - C. Myoglobin
 - D. Keratin
35. Secondary structure is defined by
- A. Vander Waals forces
 - B. Covalent bonding
 - C. **Hydrogen bonding**
 - D. Ionic bonding
36. Which of the following does not possess a quaternary structure
- A. Creatine Phospho Kinase
 - B. **Myoglobin**
 - C. Immunoglobulin M
 - D. Lactate dehydrogenase
37. In 3° structure of proteins, folding and shaping is done by
- A. None of the mentioned
 - B. **Hydrophobic interactions**
 - C. Polar interactions
 - D. Hydrogen bonding
38. All amino acids have at least one chirality center
- A. True
 - B. **False**
39. A structure that has hydrogen bonds between polypeptide chains arranged side by side is
- A. Primary structure
 - B. **β -pleated sheet**
 - C. Tertiary structure
 - D. α -helix
40. The resonance structures that can be drawn for the peptide bond indicate that the peptide
- A. is stronger than an ordinary single bond
 - B. has partial double bond character
 - C. **both (a) and (b)**
 - D. is still not completely understood

41. From which amino acid is nitrous oxide generated

- A. Asparagine
- B. Lysine
- C. Aspartic acid
- D. Arginine

A(n) protein exists in a conformation that shows biological function.

- A) structural
- B) native
- C) tertiary
- D) three-dimensional
- E) assembled

All of the following are considered "weak" interactions in proteins, except:

- A) ionic bonds.
- B) peptide bonds.
- C) hydrophobic interactions.
- D) van der Waals forces.
- E) hydrogen bonds.

All of the following statements regarding the R-groups in an α -helix are true except:

- A) the R groups all protrude out from the central axis.
- B) runs of positive R-groups will stabilize the helix.
- C) runs of negative R-groups will disrupt the helix.
- D) proline will destabilize the helix.
- E) runs of bulky R-groups will disrupt the helix because of steric hindrance.

Which of the following pairs of bonds within a peptide backbone show free rotation around both bonds?

- A) N-C and C α -C
- B) C=O and N-C
- C) N-C α and N-C
- D) C α -C and N-C α
- E) C=O and N-C α

Which factors will influence the native conformation of a protein?

- A) pH of the solution
- B) concentration of salt in solution
- C) its sequence of amino acids
- D) all of the above

Nonregular, nonrepetitive secondary structures:

- A) include α -helices and β -sheets.
- B) are bends, loops, and turns that do not have a repeating element.
- C) are β -sheets.
- D) are β -strands.
- E) include β -sheets.

In an aqueous solution, protein conformation is determined by two major factors. One is the formation of the maximum number of hydrogen bonds. The other is the:

- A) placement of hydrophobic amino acid residues within the interior of the protein.
- B) maximization of ionic interactions.
- C) placement of polar amino acid residues around the exterior of the protein.
- D) formation of the maximum number of hydrophilic interactions.

Which of the following statements about multimeric proteins is false?

- A) All subunits must be identical.
- B) Some subunits may have nonprotein prosthetic groups.
- C) Some oligomeric proteins can further associate into large fibers.
- D) Many have regulatory roles.
- E) A subunit may be similar to other proteins.

All will cause the denaturation of a protein except:

- A) refrigeration.
- B) dramatically increasing the temperature.
- C) addition of organic solvent.
- D) addition of a strong acid or base.

The native conformation of a protein:

- A) is found only when the protein is first formed, but not afterwards.
- B) has biological activity.
- C) is any possible conformation of the protein.
- D) none of the above.

Hydrogen bonds between amino acids in a polypeptide occur between which chemical groups?

- A) the C=O and C-H groups
- B) the C=O and N-H groups
- C) the C=O groups
- D) the C=O and C-R groups

The tertiary structure of a protein is usually a result of which of the following interactions?

- A) intramolecular hydrogen bonding.
- B) electrostatic interactions.
- C) hydrophobic interactions.
- D) all of the above.

The primary determinant of secondary structure of proteins is:

- A) ionic interactions.
- B) salt bridges.
- C) hydrophobic interactions of nonpolar residues.
- D) backbone hydrogen bonding.
- E) side chain hydrogen bonding.

All will cause the denaturation of a protein except:

- A) refrigeration.
- B) addition of a strong acid or base.
- C) addition of organic solvent.
- D) dramatically increasing the temperature.

Structural and functional advantages of quaternary association of proteins include all except:

- A) rigidity.
- B) genetic economy and efficiency.
- C) bringing catalytic units together.
- D) stability.
- E) cooperativity

The peptide bond:

- A) is formed by elimination of water between two amino acid residues.
- B) has partial double bond character.
- C) is the basis of protein structure.
- D) all of the above.

Which one of the following is not usually a force that helps to hold the monomer units of a quaternary protein together?

- A) hydrophobic interactions
- B) peptide bonds
- C) hydrogen bonds
- D) salt bonds

A protein in solution is more likely to maintain its native conformation when:

- A) its hydrophobic residues are largely buried in the protein interior.
- B) the shell of water becomes more ordered.
- C) the number of hydrogen bonds within a protein is minimized.
- D) the protein is least stable.

Which of the following statements about multimeric proteins is false?

- A) Some oligomeric proteins can further associate into large fibers.
- B) All subunits must be identical.
- C) A subunit may be similar to other proteins.
- D) Many have regulatory roles.
- E) Some subunits may have nonprotein prosthetic groups.

Which protein stores iron in the liver?

ferritin

Which protein stores O₂ in tissues?

Myoglobin

Which is the simplest amino acid?

glycine

Which amino acid is a basic amino acid?

-serine

-arginine

-cysteine

-alanine

What is the three-letter abbreviation of asparagine?

Asn

What is the charge on a zwitterion?

neutral

What is the charge on an amino acid at a pH below its pI?

positive

The term protein is usually reserved for polymers of more than _____ amino acids.

40

How is a dipeptide formed?

The -NH_3^+ group of one amino acid forms an amide bond with the carboxylate (-COO^-) of another amino acid, and the elements of H_2O are removed.

How many different dipeptides can be formed when one valine reacts with one glycine?

2

How many different tripeptides can be formed when one isoleucine, one alanine, and one glycine react?

6

What is the C-terminal amino acid in the tetrapeptide glycylalanyisoleucylmethionine?

methionine

What is the N-terminal amino acid in the tetrapeptide glycylalanyisoleucylmethionine?

glycine

What is the particular sequence of amino acids of a protein that are joined together by peptide bonds called?

the primary structure of a protein

What is the strongest type of interaction between two cysteine amino acid side chains in a protein?

disulfide bond

What is the strongest type of interaction between the side chains of an isoleucine amino acid and a phenylalanine amino acid in a protein?

London dispersion forces

What is the process of altering the shape of a protein without breaking the amide bonds that form the primary structure?

denaturation

Based on its name, which compound is an enzyme?

-glucose

-N-acetyl-D-glucosamine

-triosephosphate isomerase -dihydrofolate

Which is an example of a globular protein?

-collagen

-a-keratin

-hemoglobin

-amylopectin

Denaturation of a protein results in the loss of its native conformation and its biological activity. Which statement best describes what happens to a protein when it is denatured?

Secondary, tertiary, and quaternary levels of structure are disrupted.

- A diet of rice and tofu provides all essential amino acids.
- true
- The amide bonds in peptides and proteins are called peptide bonds.
- true
- By convention, the C-terminal amino acid is always written at the right end of the peptide chain and the N-terminal amino acid at the left.
- true
- The α -helix and the β -pleated sheet are examples of the tertiary structure of a protein.
- false
- The β -pleated sheet forms when two or more peptide chains, called strands, line up side-by-side with the C=O and N-H bonds in the plane of the sheets.
- true
- The hydrolysis of the amide bonds in a protein forms the individual amino acids that comprise the primary structure.
- true
- Acidic amino acids have lower pI values than basic amino acids.
- true
- Serine exists primarily in its neutral form at a pH $\sim$ 6.
- True

- The amino acids aspartic acid and glutamic acid have a +1 net charge at low pH, and a -2 net charge at high pH.
- true
- The B-pleated sheet arrangement of a protein is favored by amino acids with small side chains.
- true
- Amino acids with an additional COOH group in the side chain are classified as acidic amino acids.
- true
- All amino acids have at least one chirality center.
- False
- The R groups of the amino acids extend inward toward the core of the helix.
- False

Q. which of the following terms refers to the order in which amino acids are linked together in a protein.

Primary

Secondary

Tertiary

Quaternary

Q. The chain of amino acids folds and coils on itself

Primary

Secondary

Tertiary

Quaternary

Q. The entire polypeptide forms a three-dimensional structure

Primary

Secondary

Tertiary

Quaternary

Q. Two or more polypeptides attached together and work as one unit

Primary

Secondary

Tertiary

Quaternary

Q. What is a peptide bond?

Bond that holds two amino acids together.

A bond that holds hydrogen and oxygen molecules together.

A bond that holds the phosphate group of one nucleotide and a sugar of a neighboring nucleotide.

A bond that is formed by the sharing of electrons.

Q. How many different amino acids are there?

15

20

25

30

Q. What is the monomer of proteins?

amino acids

polypeptides

nucleotides

monosaccharides

Q. Refers to the three-dimensional structure of an entire amino acid chain in a protein molecule

tertiary structure

primary structure

secondary structure

fibrous proteins

Q. The name of the initial chain of monomers in a protein is called.....

polypeptide

polysaccharide

polyester

polynucleotide

Q. The two types of folding in the secondary structure are.....

alpha-helix & beta-pleated sheets

polypeptide & nucleotide

globular & fibrous

Q. The main bonding in the secondary structure of a protein is due to.....

covalent bonding

ionic bonding

hydrogen bonding

polar bonding

Q. What is the name of this molecule?

amino acid

nucleotide

monosaccharide

triglyceride

Q. The bond between two amino acids is called...

Peptide bond

Amino acid bond

Nothing. There isn't a name for it

Hydrogen bond

Q. Water-repelling

hydrophobic

myoglobin

coagulation

gluten

Q. tick the correct box

Secondary - silk, Tertiary - enzymes, Quaternary - haemoglobin

Secondary - haemoglobin, Tertiary - enzymes, Quaternary - silk

Secondary - Enzymes Tertiary - haemoglobin, Quaternary - silk

Secondary - Silk, Tertiary - haemoglobin, Quaternary – enzymes

Q. If a hydrophobic amino acid sequence is placed in water the amino acids will

fold in half

unfold

bunch up

spread out

Q. The level of protein structure that results from hydrogen bonding causing the protein to fold into α -helix and β -pleated sheets is known as

primary structure

secondary structure

tertiary structure

quaternary structure

Q. What is the monomer of a protein?

amino acid

monosaccharide

fatty acid

Q. Which stage is it where all of the amino acids are in a straight line?

answer choices

1

2

3

4

Q. The name of the initial chain of monomers in a protein is called.....

polypeptide

polysaccharide

polyester

polynucleotide

Q. The main bonding in the secondary structure of a protein is due to.....

covalent bonding

ionic bonding

hydrogen bonding

polar bonding

Q. The tertiary structure folding in proteins is primary due to the interactions of....

the 'R' groups

the 'P' groups

the 'A' groups

the 'S'

Q. Which is not a use or function of protein?

forms enzymes and hormones

forms transport channel in cell membrane

forms structural proteins in the body

quick energy

Q. Alpha helix and beta pleated sheets are part of what level of protein structure?

primary

secondary

tertiary

quaternary

Q. When a protein unfolds, it is

Denatured

Building

Adding amino acids

Making food

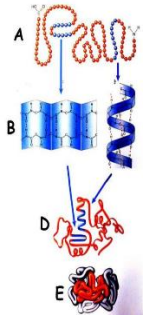
Q. Which structure changes in the 20 different amino acids?

#1

#2

#3

#4



Q. Which letter corresponds to an alpha helix?

A

B

C

D

Q. Which letter corresponds to an beta sheet?

A

B

C

D

Q. Which letter corresponds to the primary protein structure?

A

B

C

D

Q. Which letter corresponds to the tertiary protein structure?

A

B

C

D

Q. Does the structure (shape) of a protein affect the function (what it does)?

Yes

No

1. Identify the amino acids containing nonpolar, aliphatic R groups.
- a) Phenylalanine, tyrosine, and tryptophan
 - b) Glycine, alanine, leucine
 - c) Lysine, arginine, histidine
 - d) Serine, threonine, cysteine
2. The two amino acids having R groups with a negative net charge at pH 7.0 are

a) Aspartate and glutamate

- b) Arginine and histidine
- c) Cysteine and methionine
- d) Proline and valine

3. If $pK_1 = 2.34$ and $pK_2 = 9.60$, then the isoelectric point pI is?

a) 5.87

b) 5.97

c) 3.67

d) 11.94

4. Which of the following is a true statement?

a) Tryptophan and tyrosine are significantly more polar than phenylalanine

b) Leucine is commonly used as an ingredient in the buffers of SDS page

c) Aspartate is an essential amino acid

d) Lysine is a non-essential amino acid

5. Which among the following is a non-essential amino acid?

a) Serine

b) Threonine

c) Lysine

d) Histidine

6. Which of the following is an essential amino acid?

a) Cysteine

b) Asparagine

c) Glutamine

d) Phenylalanine

7. Which of the following is an imino acid?

a) Alanine

b) Glycine

c) Proline

d) Serine

8. Which among the following is both glucogenic and ketogenic?

a) Isoleucine

b) Leucine

c) Lysine

d) Histidine

9. An amino acid that yields acetoacetyl CoA during the catabolism of its carbon skeleton will be considered as _____

a) Glycogenic

b) Ketogenic

c) Both glycogenic and ketogenic

d) Essential

10. Number of chiral centers in isoleucine is?

a) 1

b) 2

c) 3

d) 4

1. During the formation of the peptide bond which of the following takes place?

a) Hydroxyl group is lost from its carboxyl group of one amino acid and a hydrogen atom is lost from its amino group of another amino acid

b) Hydrogen atom is lost from its carboxyl group of one amino acid and a hydroxyl group is lost from its amino group of another amino acid

c) Hydroxyl group is lost from its carboxyl group of one amino acid and a hydroxyl group is lost from its amino group of another amino acid

d) Hydrogen atom is lost from its carboxyl group of one amino acid and a hydrogen atom is lost from its amino group of another amino acid

2. Peptide bond is a _____

a) Covalent bond

b) Ionic bond

c) Metallic bond

d) Hydrogen bond

3. A tripeptide has _____

a) 3 amino acids and 1 peptide bond

b) 3 amino acids and 2 peptide bonds

c) 3 amino acids and 3 peptide bonds

d) 3 amino acids and 4 peptide bonds

4. The factor which does not affect pK_a value of an amino acid is _____

a) The loss of charge in the α -carboxyl and α -amino groups

b) The interactions with other peptide R groups

c) Other environmental factors

d) Molecular weight

5. Which of the following is a 39-residue hormone of the anterior pituitary gland?

a) Corticotropin

b) Glucagon

c) Insulin

d) Bradykinin

6. The average molecular weight of an amino acid residue in a protein is about a) 128

b) 118

c) 110

d) 120

7. Which of the following is not the classified form of conjugated proteins?

a) Lipoproteins

b) Glycoproteins

c) Metalloproteins

d) Complete proteins

8. Which part of the amino acid gives it uniqueness?

a) Amino group

b) Carboxyl group

c) Side chain

d) None of the mentioned

9. Which of the following information is responsible to specify the three-dimensional shape of a protein?

a) The protein's peptide bond

b) The protein's amino acid sequence

c) The protein's interaction with other polypeptides

d) The protein's interaction with molecular chaperons

10. Unfolding of a protein can be termed as _____

a) Renaturation

b) Denaturation

c) Oxidation

d) Reduction

11. What are the following is not a factor responsible for the denaturation of proteins?

a) pH change

b) Organic solvents

c) Heat

d) Charge

1. The salt which produces salting out effect during extraction of proteins is?

a) $\text{NH}_4 \text{SO}_4$

b) $(\text{NH}_4)_2 \text{SO}_4$

c) $(\text{NH}_4)_3 \text{SO}_4$

d) NaCl

2. Mobile phase can be _____

a) Only solid

b) Only gas

c) Solid or liquid

d) Liquid or gas

3. The pattern on paper in chromatography is called _____

- a) Chroming
- b) Chroma
- c) Chromatograph
- d) Chromatogram

4. Which of the following statements about column chromatography is correct?

- a) Resolution increases as the length of the column increases
- b) Mobile phase is a porous solid material with appropriate chemical properties held in the column
- c) Stationary phase is a buffered solution that percolates through mobile phase
- d) Large proteins emerge from the column sooner than small ones

5. Which of the following statements is true about size-exclusion chromatography?

- a) During the separation of a mixture of proteins, protein with smallest molecular weight is eluted first
- b) During the separation of a mixture of proteins, protein with largest molecular weight is eluted first
- c) During the separation of a mixture of proteins, protein with largest molecular weight is eluted last
- d) During the separation of a mixture of proteins, protein with largest molecular weight flow around the beads

6. Which of the following statements is true about affinity chromatography?

- a) During the separation of a mixture of proteins, the protein which does not bind to ligand is eluted first
- b) During the separation of a mixture of proteins, the protein which does not bind to ligand is eluted last
- c) During the separation of a mixture of proteins, the protein which binds to ligand is eluted first
- d) Unwanted proteins are eluted by ligand solution

7. Which of the following statements is true about ion-exchange chromatography?

- a) It separates proteins according to their size
- b) The column matrix with bound anionic groups is called cationic exchanger
- c) The column matrix with bound anionic groups is called anionic exchanger
- d) The column matrix with bound cationic groups is called cationic exchanger

8. Which of the following statements is true about SDS polyacrylamide chromatography?

- a) SDS polyacrylamide gel electrophoresis separates proteins on the basis of size
- b) SDS polyacrylamide gel electrophoresis separates proteins on the basis of charge
- c) SDS binds to proteins non-covalently with a stoichiometry of around one SDS molecule per three amino acids
- d) SDS binds to proteins non-covalently with a stoichiometry of around one SDS molecule per one amino acid

9. Which of the following statements is true about two-dimensional electrophoresis?

a) Separates proteins of identical molecular weight, same pI but different charge

b) Separates proteins of different molecular weight and different pI

c) Separates proteins of identical molecular weight that differ in pI

d) Isoelectric focusing is also termed as two-dimensional electrophoresis

10. Which of the following statements is false?

a) The term activity refers to the total units of enzyme in a solution

b) The specific activity is a measure of enzyme purity

c) Specific activity increases during purification of an enzyme and becomes maximal and constant when the enzyme is pure

d) Specific activity decreases during purification of an enzyme and becomes maximal and constant when the enzyme is pure

1. Which of the following statements is false?

a) Primary structure of a protein determines how it folds up into a unique three dimensional structure

b) Secondary structure of a protein determines how it folds up into a unique three dimensional structure

c) Three dimensional structure of a protein determines the function of a protein

d) Amino acid sequence is absolutely invariant for a particular protein

2. Who deduced the double-helical structure of DNA?

a) Frederick Sanger

b) Mendel

c) Watson and Francis Crick

d) Anton van Leeuwenhoek

3. Two chains of amino acids in an insulin molecule are held together by _____

a) Sulfide bridges

b) Disulfide bridges

c) Peptide bond

d) Covalent linkage

4. Tertiary conformation of proteins is maintained by 3 types of bonds namely ionic, hydrogen and _____

a) Sulfide

b) Disulfide

c) Covalent

d) Peptide

5. Hemoglobin is a _____

a) Monomer

b) Dimer

c) Trimer

d) Tetramer

6. Which of the following is false?

- a) The two main types of secondary structure are the α helix and β pleet structures
- b) α helix is a right handed coiled strand
- c) The hydrogen bonding in a β -sheet is between strands rather than within strands
- d) The hydrogen bonding in a β -sheet is within strands rather than between strands

7. Native state of a protein can be disrupted by _____

- a) Temperature
- b) pH
- c) Removal of water
- d) Presence of hydrophilic surfaces

8. Which of the following is true?

- a) The disulfide bridges formed by reduction of the sulfhydryl groups on cysteine stabilizes protein tertiary structure
- b) The disulfide bridges formed by oxidation of the sulfhydryl groups on cysteine destabilizes protein tertiary structure
- c) The disulfide bridges formed by oxidation of the sulfhydryl groups on cysteine stabilizes protein tertiary structure
- d) The disulfide bridges formed by reduction of the sulfhydryl groups on cysteine destabilizes protein tertiary structure

9. Identify the wrong statement.

- a) Hemoglobin is a globular protein
- b) Hemoglobin is a fibrous protein
- c) Fibrous proteins are insoluble in water
- d) Collagen is a fibrous protein

10. In 3° structure of proteins, folding and shaping is done by _____

- a) Hydrophobic interactions
- b) Polar interactions
- c) Hydrogen bonding
- d) None of the mentioned

1. Amino acids sequence in DNA can be determined by the order of their _____

- a) rRNA
- b) tRNA
- c) Nucleotides
- d) mRNA

2. Which of the following is a Sanger's reagent?

- a) 1-fluoro-2, 4-dinitrobenzene
- b) 1-fluoro-2, 3-dinitrobenzene
- c) 1-fluoro-2, 4-trinitrobenzene
- d) 1-fluoro-2, 3-trinitrobenzene

3. The amino acid sequences of thousands of different proteins from many species have been determined using principles first developed by?

a) Edman

b) Sanger

c) Mendel

d) Watson and Crick

4. Which of the following compound is not involved in Edman degradation?

a) Phenylisothiocyanate

b) CF_3COOH

c) FDNB

d) Phenylthiocarbonyl

5. Which of the following statements is false?

a) Oxidation of cysteine residue with performic acid is done to break disulfide bond in proteins

b) Reduction of cysteine residue with dithiothreitol is done to break disulfide bond in proteins

c) Reduction of cysteine residue with performic acid is done to break disulfide bond in proteins

d) Reduced cysteine is further acetylated by iodoacetate

6. Cleaving of peptide chain is done by _____

a) Trypsin

b) Tyrosine

c) Tryptophan

d) Arginine

7. Which of the following is the correct order of sequencing?

a) Cleaving, sequencing and ordering

b) Sequencing, ordering and cleaving

c) Ordering, cleaving and sequencing

d) Ordering, sequencing and cleaving

8. Edman degradation is used for _____

a) Identifying N-terminal amino acids

b) Identifying C-terminal amino acids

c) Identifying amino acid

d) Identifying carbohydrates

9. What best summarizes the MALDI method by which gas phase ions are produced for mass spectrometry?

a) Sample is hit by a low energy xenon beam

b) Sample is forced through a narrow capillary tube and the solvent rapidly evaporates

c) Sample is embedded in a crystalline matrix and bombarded by laser beams

d) Sample is heated and then bombarded by electrons

10. Which of the following is Edman reagent?

a) Phenylisothiocyanate

b) CF_3COOH

c) FDNB

d) Phenylthiocarbonyl

1. Which of the following does not affect the stability of an α -helix?

a) Electrostatic repulsion

b) Bulkiness

c) Interaction between R groups spaced three residues apart

d) Occurrence of alanine and glycine residues

2. Which of the following is not true about secondary protein structure?

a) The hydrophilic/hydrophobic character of amino acid residues is important to secondary structure

b) The ability of peptide bonds to form intramolecular hydrogen bonds is important to secondary structure

c) The alpha helix, beta pleated sheet and beta turns are examples of protein secondary structure

d) The steric influence of amino acid residues is important to secondary structure

3. β -pleated sheets are the examples of _____

a) Primary structure

b) Secondary structure

c) Tertiary structure

d) Quaternary structure

4. A coiled peptide chain held in place by hydrogen bonding between peptide bonds in the same chain is?

a) Primary structure

b) α -helix

c) β -pleated sheets

d) Tertiary structure

5. A structure that has hydrogen bonds between polypeptide chains arranged side by side is?

a) Primary structure

b) α -helix

c) β -pleated sheets

d) Tertiary structure

6. Which of the following are known as helix breakers?

a) Proline and glycine

b) Isoleucine and leucine

c) Valine

d) Threonine

7. Which of the following is false about NMR spectroscopy?

- a) NMR is an abbreviated form of Nuclear Magnetic Resonance
- b) The intramolecular magnetic field around an atom in a molecule changes the resonance frequency giving structural information about the atom
- c) The intermolecular magnetic field around an atom in a molecule changes the resonance frequency giving structural information about the atom
- d) It is a technique that exploits magnetic properties of atomic nuclei

8. Which of the statements is false about multiple sequence alignment?

- a) Both protein and nucleic acid secondary structures can be used
- b) More useful in RNA
- c) These alignments can be made more accurate by the inclusion of secondary structure information
- d) A significant increase in accuracy

9. Secondary structure is defined by _____

- a) Hydrogen bonding
- b) Vander Waals forces
- c) Covalent bonding
- d) Ionic bonding

10. Which of the following is a false statement?

- a) α -Keratin is α helical
- b) Collagen is α helical
- c) Hemoglobin has a quaternary structure
- d) α -Keratin is β pleated structure

1. Fibroin is rich in _____

- a) Alanine and Glycine
- b) Alanine
- c) Glycine
- d) Pro

2. Which of the following bonds are not involved in tertiary type of protein structure?

- a) Disulfide bond
- b) Hydrogen bonding
- c) Salt bridges
- d) Hydrophilic interactions

3. Which of the following does not possess a quaternary structure?

- a) Myoglobin
- b) Lactate dehydrogenase
- c) Immunoglobulin M
- d) Creatine Phospho Kinase

4. Which of the following is abundantly found in collagen?

- a) Glycine
- b) Serine
- c) Alanine
- d) Tryptophan

5. Which of the following is first determined as oligomer?

- a) Myoglobin
- b) Collagen
- c) Keratin
- d) Hemoglobin

6. Which of the following is false?

- a) Lysozyme has S-S linkage
- b) Ribonuclease has S-S linkage
- c) Heme group in cytochrome c is covalently linked to the protein on two sides
- d) Ribonuclease has SH-SH linkage

7. Which of the following enzyme is secreted by the pancreas?

- a) Ribonuclease
- b) Lysozyme
- c) Cytochrome c
- d) Myoglobin

8. Which of the following is a component of mitochondria?

- a) Ribonuclease
- b) Lysozyme
- c) Cytochrome c
- d) Myoglobin

9. Which of the following serves as bactericidal agent?

- a) Ribonuclease
- b) Lysozyme
- c) Cytochrome c
- d) Myoglobin

10. Which of the following is false about fibrous protein?

- a) It is in rod or wire like shape
- b) Keratin and collagen are the best examples
- c) Hemoglobin is the best example
- d) It provides structural support for cells and tissues

1. Which of the following forces is favorable for protein folding?

- a) Hydrophobic interactions
- b) Hydrogen bonding
- c) Vander Waals forces
- d) Ionic bonding

2. A process by which a protein structure assumes its functional shape or conformation is?

a) Denaturing

b) Folding

c) Synthesis

d) Hydrolysis

3. Process of folding does not depend on _____

a) Concentration of salts

b) pH

c) Solute

d) Solvent

4. Which of the following cannot denature a protein?

a) Iodoacetic acid

b) SDS detergent

c) Urea

d) Heating to 90°C

5. Which of the following is a function of chaperone protein?

a) It degrades proteins that have folded improperly

b) It provide a template for how the proteins should fold

c) It rescues proteins that have folded improperly and allows them to refold properly

d) It degrades proteins that have folded properly

6. As folding progresses which of the following does not take place?

a) Entropy decreases

b) Amount of protein in native state increases

c) Free energy increases

d) Amount of protein in native state decreases

7. Which of the following are chaperons in E.coli?

a) Hsp70

b) Hsp40

c) DnaA

d) DnaK and DnaJ

8. Which of the following about spontaneous folding is false?

a) It involves the initial formation of highly compact structure

b) It involves initial formation of a local secondary structure

c) It is essentially a random process

d) It may be defective in some human diseases

9. Protein A will fold into its native state only when protein B is also present in the solution. However, protein B can fold itself into native confirmation without the presence of protein A. Which of the following is true?

- a) Protein B serves as precursor for protein A
- b) Protein B serves as molecular chaperon for protein A
- c) Protein B serves as ligand for protein A
- d) Protein B serves as structural motif for protein A

10. Which of the following is true about ribonuclease?

- a) Native state which is catalytically inactive is denatured
- b) Unfolded state is inactive
- c) Renatured ribonuclease is inactive
- d) Renaturation involves reestablishment of the correct disulfide cross links

1. The general structure of all amino acids are same except for _____

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

2. An amino acid is an amphoteric molecule.

- a) True
- b) False

3. Which of these amino acids are not optically active?

- a) Cysteine
- b) Lysine
- c) Arginine
- d) Glycine

4. Which of these are used to measure optical activity?

- a) Polarimeter
- b) Planometer
- c) Psychrometer
- d) Photometer

5. A solution of L-alanine (4.0g/50 ml of 6 N HCl) has a rotation of $+1.61^\circ$ in a 2dm polarimeter tube. Calculate the specific rotation of L-alanine in 6 N HCl.

- a) $+15.1^\circ$
- b) $+10.1^\circ$
- c) $+11.1^\circ$
- d) $+16.1^\circ$

6. Name the amino acid, which exists in two non-superimposable mirror images of each other.

- a) Epimer
- b) Anomer
- c) Enantiomer
- d) Chiral carbon

7. Which of these are rare amino acid in a protein?

- a) Leucine and serine
- b) Lysine and glutamic acid
- c) Tryptophan and methionine
- d) Leucine and lysine

8. In which amino acid Imidazole group, an aromatic ring found?

- a) Lysine
- b) Arginine
- c) Histidine
- d) Glutamate

9. What is the maximum wavelength that Tryptophan and tyrosine absorb?

- a) 280nm
- b) 260nm
- c) 257nm
- d) 230nm

10. How is the secondary structure of a protein stabilized?

- a) Van der Waals forces
- b) Hydrogen bonding
- c) Covalent bond
- d) Hydrophobic bond

11. How many amino acid residues are there in per turn of α -helix?

- a) 3.6
- b) 4.6
- c) 3.0
- d) 2.5

1. The α -amino acids have a carboxyl group with a pK around ___, and an amino group with a pK near ___.

1.1, and 12.1

6.5, and 8.0.

3.3, and 10.5.

9.0, and 2.5.

2.0, and 9.5.

2. Which pair of amino acids absorbs the most UV light at 280 nm?

Thr & His.

Trp & Tyr.

Cys & Asp.

Phe & Pro.

None of the above.

3. Which of the following is not a sensible grouping of amino acids based on their polarity properties?

Ala, Leu, and Val.

Arg, His, and Lys.

Phe, Trp, and Tyr.

Asp, Ile, and Pro.

Asn, Ser, and Thr.

4. The isoelectric point of an amino acid is defined as

the pH where the molecule carries no net electric charge.

the pH where the carboxyl group is uncharged.

the pH where the amino group is uncharged.

the pH of maximum electrolytic mobility.

$-\log_{10}(pK_i + pK_j)$

5. When the amino acid alanine (the R-group is: $-\text{CH}_3$) is added to a solution with a pH of 7.3, alanine becomes:

a cation.

nonpolar.

a zwitterion.

an isotope.

an anion.

6. The peptide bond in proteins is

planar, but rotates to three preferred dihedral angles.

nonpolar, but rotates to three preferred dihedral angles.

nonpolar, and fixed in a trans conformation.

planar, and usually found in a trans conformation.

not cleavable by hydrolysis.

2. The molecular formula for glycine is $C_2H_5O_2N$. What would be the molecular formula for a linear oligomer made by linking ten glycine molecules together by condensation synthesis?

$C_{20}H_{50}O_{20}N_{10}$.

$C_{20}H_{32}O_{11}N_{10}$.

$C_{20}H_{40}O_{10}N_{10}$.

$C_{20}H_{68}O_{29}N_{10}$.

None of the above.

8. The resonance structures that can be drawn for the peptide bond indicate that the peptide bond

still isn't completely understood by chemists.

is stronger than an ordinary single bond.

has partial double bond character.

is weaker than an ordinary single bond.

The second and third choices are both correct.

9. The peptide bond in proteins is

only found between proline residues.

usually cis unless proline is the next amino acid.

usually trans unless proline is the next amino acid.

is planar because of steric hinderance.

defines one of the angles used in the Ramachandran plot.

the most important contribution to the stability of a protein's conformation appears to be the:

A) entropy increase from the decrease in ordered water molecules forming a solvent shell around it.

B) maximum entropy increase from ionic interactions between the ionized amino acids in a protein.

C) sum of free energies of formation of many weak interactions among the hundreds of amino acids in a protein.

D) sum of free energies of formation of many weak interactions between its polar amino acids and surrounding water.

E) stabilizing effect of hydrogen bonding between the carbonyl group of one peptide bond and the amino group of another.

In an aqueous solution, protein conformation is determined by two major factors. One is the formation of the maximum number of hydrogen bonds. The other is the:

A) formation of the maximum number of hydrophilic interactions.

B) maximization of ionic interactions.

C) minimization of entropy by the formation of a water solvent shell around the protein.

D) placement of hydrophobic amino acid residues within the interior of the protein.

E) placement of polar amino acid residues around the exterior of the protein.

Pauling and Corey's studies of the peptide bond showed that:

A) at pH 7, many different peptide bond conformations are equally probable.

B) peptide bonds are essentially planar, with no rotation about the C—N axis.

C) peptide bonds in proteins are unusual, and unlike those in small model compounds.

D) peptide bond structure is extraordinarily complex.

E) primary structure of all proteins is similar, although the secondary and tertiary structure may differ greatly.

the plane drawn behind the peptide bond indicates the (drawn behind the peptide bond)

A) absence of rotation around the C—N bond because of its partial double-bond character.

B) plane of rotation around the C α —N bond.

C) region of steric hindrance determined by the large C=O group.

D) region of the peptide bond that contributes to a Ramachandran plot.

E) theoretical space between -180 and +180 degrees that can be occupied by the ϕ and ψ angles in the peptide bond.

Which of the following best represents the backbone arrangement of two peptide bonds?

A) C α —N—C α —C—C α —N—C α —C

B) C α —N—C—C—N—C α

C) C—N—C α —C α —C—N

D) C α —C—N—C α —C—N

E) C α —C α —C—N—C α —C α —C

Which of the following pairs of bonds within a peptide backbone show free rotation around both bonds?

A) C α —C and N—C α

B) C=O and N—C

C) C=O and N—C α

D) N—C and C α —C

E) N—C α and N—C

Roughly how many amino acids are there in one turn of an α helix?

A) 1

B) 2.8

C) 3.6

D) 4.2

E) 10

In the alpha helix the hydrogen bonds:

- A) are roughly parallel to the axis of the helix.
- B) are roughly perpendicular to the axis of the helix.
- C) occur mainly between electronegative atoms of the R groups.
- D) occur only between some of the amino acids of the helix.
- E) occur only near the amino and carboxyl termini of the helix.

Thr and/or Leu residues tend to disrupt an α helix when they occur next to each other in a protein because:

- A) an amino acids like Thr is highly hydrophobic.
- B) covalent interactions may occur between the Thr side chains.
- C) electrostatic repulsion occurs between the Thr side chains.
- D) steric hindrance occurs between the bulky Thr side chains.
- E) the R group of Thr can form a hydrogen bond.

A D-amino acid would interrupt an α helix made of L-amino acids. Another naturally occurring hindrance to the formation of an α helix is the presence of:

- A) a negatively charged Arg residue.
- B) a nonpolar residue near the carboxyl terminus.
- C) a positively charged Lys residue.
- D) a Pro residue.
- E) two Ala residues side by side.

An α helix would be destabilized most by:

- A) an electric dipole spanning several peptide bonds throughout the α helix.
- B) interactions between neighboring Asp and Arg residues.
- C) interactions between two adjacent hydrophobic Val residues.
- D) the presence of an Arg residue near the carboxyl terminus of the α helix.
- E) the presence of two Lys residues near the amino terminus of the α helix.

The major reason that antiparallel β -stranded protein structures are more stable than parallel β -stranded structures is that the latter:

- A) are in a slightly less extended configuration than antiparallel strands.
- B) do not have as many disulfide crosslinks between adjacent strands.
- C) do not stack in sheets as well as antiparallel strands.
- D) have fewer lateral hydrogen bonds than antiparallel strands.
- E) have weaker hydrogen bonds laterally between adjacent strands.

A sequence of amino acids in a certain protein is found to be -Ser-Gly-Pro-Gly-. The sequence is most probably part of a(n):

- A) antiparallel β sheet.
- B) parallel β sheet.
- C) α helix.
- D) α sheet.
- E) β turn.

The three-dimensional conformation of a protein may be strongly influenced by amino acid residues that are very far apart in sequence. This relationship is in contrast to secondary structure, where the amino acid residues are:

- A) always side by side.
- B) generally near each other in sequence.
- C) invariably restricted to about 7 of the 20 standard amino acids.
- D) often on different polypeptide strands.
- E) usually near the polypeptide chain's amino terminus or carboxyl terminus.

The α -keratin chains indicated by the diagram below have undergone one chemical step (S-S to SH SH). To alter the shape of the α -keratin chains—as in hair waving—what subsequent steps are required?

- A) Chemical oxidation and then shape remodeling
- B) Chemical reduction and then chemical oxidation
- C) Chemical reduction and then shape remodeling
- D) Shape remodeling and then chemical oxidation
- E) Shape remodeling and then chemical reduction

Which of the following statements is false?

- A) Collagen is a protein in which the polypeptides are mainly in the α -helix conformation.
- B) Disulfide linkages are important for keratin structure.
- C) Gly residues are particularly abundant in collagen.
- D) Silk fibroin is a protein in which the polypeptide is almost entirely in the α conformation.
- E) α -keratin is a protein in which the polypeptides are mainly in the α -helix conformation.

Kendrew's studies of the globular myoglobin structure demonstrated that:

- A) "corners" between α -helical regions invariably lacked proline residue.
- B) highly polar or charged amino acid residues tended to be located interiorally.
- C) myoglobin was completely different from hemoglobin, as expected.
- D) the structure was very compact, with virtually no internal space available for water.
- E) the α helix predicted by Pauling and Corey was not found in myoglobin.

Determining the precise arrangement of atoms within a large protein is possible only through the use of:

- A) electron microscopy.
- B) light microscopy.
- C) molecular model building.
- D) Ramachandran plots.
- E) x-ray diffraction.

Analysis of x-ray diffraction data yields a(n) ; analysis of 2D NMR data yields a(n) .

- A) electron density map; count of hydrogen atoms in the molecule
- B) shadow of protein's outline; estimate of protein's molecular volume
- C) table of interatomic distances; electron density map
- D) electronic density map; table of interatomic distances**
- E) 3-d protein structure; 2-d protein structure

Which of the following statements concerning protein domains is true?

- A) They are a form of secondary structure.
- B) They are examples of structural motifs.
- C) They consist of separate polypeptide chains (subunits).
- D) They have been found only in prokaryotic proteins.
- E) They may retain their correct shape even when separated from the rest of the protein.**

The structural classification of proteins (based on motifs) is based primarily on their:

- A) amino acid sequence.
- B) evolutionary relationships.
- C) function.
- D) secondary structure content and arrangement.**
- E) subunit content and arrangement.

Proteins are classified within families or superfamilies based on similarities in:

- A) evolutionary origin.
- B) physico-chemical properties.
- C) structure and/or function.**
- D) subcellular location.
- E) subunit structure.

Which of the following statements about oligomeric proteins is false?

- A) A subunit may be similar to other proteins.
- B) All subunits must be identical.
- C) Many have regulatory roles.
- D) Some oligomeric proteins can further associate into large fibers.
- E) Some subunits may have nonprotein prosthetic groups.

A repeating structural unit in a multimeric protein is known as a(n):

- A) domain.
- B) motif.
- C) oligomer.
- D) protomer.
- E) subunit.

Which of the following statements concerning rotational symmetry in proteins is false?

- A) It involves rotation of proteins inside the cell.
- B) It is frequently seen in the subunits of oligomeric proteins.
- C) It is frequently seen in viruses.
- D) It may involve rotation about one or more axes.
- E) It results in closed, packed structures.

An average protein will not be denatured by:

- A) a detergent such as sodium dodecyl sulfate.
- B) heating to 90°C.
- C) iodoacetic acid.
- D) pH 10.
- E) urea.

Which of the following is least likely to result in protein denaturation?

- A) Altering net charge by changing pH
- B) Changing the salt concentration
- C) Disruption of weak interactions by boiling
- D) Exposure to detergents
- E) Mixing with organic solvents such as acetone

Experiments on denaturation and renaturation after the reduction and reoxidation of the —S—S— bonds in the enzyme ribonuclease (RNase) have shown that:

- A) folding of denatured RNase into the native, active conformation, requires the input of energy in the form of heat.
- B) native ribonuclease does not have a unique secondary and tertiary structure.
- C) the completely unfolded enzyme, with all —S—S— bonds broken, is still enzymatically active.
- D) the enzyme, dissolved in water, is thermodynamically stable relative to the mixture of amino acids whose residues are contained in RNase.
- E) the primary sequence of RNase is sufficient to determine its specific secondary and tertiary structure.

Which of the following statements concerning the process of spontaneous folding of proteins is false?

- A) It may be an essentially random process.
- B) It may be defective in some human diseases.
- C) It may involve a gradually decreasing range of conformational species.
- D) It may involve initial formation of a highly compact state.
- E) It may involve initial formation of local secondary structure.

Protein S will fold into its native conformation only when protein Q is also present in the solution. However, protein Q can fold into its native conformation without protein S. Protein Q, therefore, may function as a _____ for protein S.

- A) ligand
- B) molecular chaperone**
- C) protein precursor
- D) structural motif
- E) supersecondary structural unit

Which of the following is not known to be involved in the process of assisted folding of proteins?

- A) Chaperonins
- B) Disulfide interchange
- C) Heat shock proteins
- D) Peptide bond hydrolysis**
- E) Peptide bond isomerization

AMINO ACID 1

1. Which of the following amino acid is sweet in taste?

- A. Glycine**
- B. Alanine
- C. Glutamic acid
- D. None of these

2. Which of the following amino acids act as an inhibitory neurotransmitter?

- A. Glycine
- B. Alanine
- C. GABA
- D. All of these**
- E. None of these

3. The amino acid commonly used as an ingredient in the buffers of SDS PAGE

A. Aspartic acid

B. Glutamic acid

C. Glycine

D. Aspartic acid and Lysine together

4. Which of the following amino acid will be absent in the α (alpha)-helix structure of protein?

A. Glycine

B. Galine

C. Glutamic acid

D. Proline

5. Aminolevulinic acid, the first product in porphyrin biosynthesis in eukaryotes, is synthesized from ____ and succinyl-CoA

A. Valine

B. Tryptophan

C. Methionine

D. Glycine

6. Carnosine is a dipeptide of histidine and _____

A. β -Histidine

B. β -Alanine

C. β -Lysine

D. α -Lysine

E. Tryptophan

7. Which of the following enzymes contain Selenocysteine?

A. Nitrate reductase

B. Catalase

C. Glutathione peroxidase

D. All of these

8. Amino acid used in the “stripping” of Western blotting experiment is

- A. Glutamic acid
- B. Phenyl alanine
- C. Alanine

D. Glycine

9. Total number of proteinogenic (protein building) amino acids in the living world is ____

- A. 20
- B. 21

C. 22

- D. 23

10. Amino acid selenocysteine is coded by_____

- A. UAA
- B. UAG

C. UGA

- D. AUG

11. Which of the following is a glucogenic amino acid?

- A. Glycine
- B. Proline
- C. Alanine
- D. Both A and B

E. All of these

12. Which of the following amino acid act as excitatory neurotransmitter?

- A. Glutamate
- B. Aspartate
- C. Cysteine

D. All of these

- E. None of these

13. Which amino acid acts as the precursor of nucleotide biosynthesis?

A. Aspartate

B. Glycine

C. Glutamine

D. Both A and B

E. All of these

14. Bacteria prefer to use the codon CGA instead of AGA to code for Arginine. This is an example for _____

A. Second genetic code

B. Nullomers

C. Transcriptional decoding

D. Allomers

15. Which of the following is an example for a bioplastic?

A. Polyaspartate

B. Polyglutamate

C. Poly-L-lysine

D. All of these

16. Histones are rich in _____

A. Lysine

B. Arginine

C. Histidine

D. Lysine and Arginine

17. Single letter code of pyrrolysine is _____

A. B

B. J

C. O

D. U

18. Which of the following is not an essential amino acid?

- A. Proline
- B. Histidine
- C. Leucine
- D. Methionine

19. What is the molecular weight of Glycine?

- A. 75 g·mol⁻¹
- B. 80 g·mol⁻¹
- C. 90 g·mol⁻¹
- D. 95 g·mol⁻¹

20. Among the 20 standard proteins coding amino acids, which one is the least occurring in proteins?

- A. Glycine
- B. Alanine
- C. Tryptophan
- D. Methionine

AMINO ACID 2

1. Which amino acid, among the 20 standard protein-coding amino acids, occurs most abundantly in proteins?

- A. Glycine
- B. Methionine
- C. Serine
- D. Leucine

2. Which of the following amino acids is having more polarity?

- A. Lysine
- B. Arginine
- C. Histidine
- D. Aspartate

3. Majority of enzyme's active sites usually contain one or more _____ residues

A. Glycine

B. Tryptophan

C. Histidine

D. Arginine

4. The following is the amino acid sequence of an alien polypeptide: "AGQHIKXSKPWYVGLBUFF." The "X" in the given sequence represents _____

A. Asparagine

B. Isoleucine

C. An ambiguous amino acid

D. An unknown amino acid

5. The amino acid acting as a defensive molecule in plants

A. Canavanine

B. Concanavalin

C. Proline

D. All of these

6. Which amino acid acts as the precursor for the synthesis of the neurotransmitter serotonin?

A. Tyrosine

B. Tryptophan

C. Glycine

D. Arginine

7. _____ is an exclusively ketogenic amino acid in human

A. Valine

B. Methionine

C. Leucine

D. Proline

8. pH of _____ is near to physiological pH

A. Lysine

B. Histidine

C. Arginine

D. Glutamic acid

9. Which amino acid acts as the precursor of dopamine?

A. Glycine

B. Aspartate

C. Valine

D. Tyrosine

10. What is the molecular weight of Tryptophan?

A. 202 g.mol⁻¹

B. 204 g.mol⁻¹

C. 206 g.mol⁻¹

D. 208 g.mol⁻¹

11. The amino acid which acts as the precursor of IAA (indole 3-acetic acid) biosynthesis in plants is _____

A. Tyrosine

B. Phenylalanine

C. Tryptophan

D. Methionine

12. The amino acid involved in urea cycle is _____

A. Ornithine

B. Citrulline

C. Arginine

D. Both A and B

E. All of these

13. Which of the following amino acids have the buffering capacity at physiological pH?

A. Lysine

B. Arginine

C. Histidine

D. Aspartic acid

14. The amino acid which acts as the precursor of epinephrine synthesis is _____

A. Glycine

B. Aspartate

C. Tyrosine

D. Valine

15. Which amino acid acts as the precursor of nitric oxide biosynthesis in animals?

A. Phenyl alanine

B. Arginine

C. Aspartate

D. Ornithine

16. Which of the following is an essential amino acid?

A. Aspartic acid

B. Alanine

C. Leucine

D. Asparagine

E. All of these

17. Which of the following is a nonessential amino acid?

A. Alanine

B. Histidine

C. Lysine

D. Methionine

E. All of these

18. Which of the following amino acids is coded by a single codon?

A. Lysine

B. Arginine

C. Tryptophan

D. Phenylalanine

19. First discovered amino acid is _____

A. Asparagine

B. Aspartate

C. Glutamate

D. Glutamine

20. Among the 20 standard protein-coding amino acids, which was the last discovered amino acid?

A. Leucine

B. Isoleucine

C. Threonine

D. Serine

AMINO ACID 3

1. Which group of a fully protonated glycine ($\text{NH}_3^+\text{--CH}_2\text{--COOH}$) first release a "proton" when it is titrated against OH^- ions?

A. Carboxyl group

B. Amino group

C. Both at the same time

D. It cannot be predicted

2. pKa is the measure of a group to _____ proton.

A. Take up

B. Release

C. Combine

D. Consume

3. Which of the following amino acids bears a guanidine group in the side chain?

A. Lysine

B. Arginine

C. Histidine

D. Proline

4. The precursor of glycine synthesis in microbes and plants is _____

A. Serine

B. Leucine

C. Valine

D. None of these

5. The single letter code of selenocysteine is _____

A. B

B. J

C. U

D. O

6. Which of the following amino acids have an imino group in the side chain?

A. Proline

B. Asparagine

C. Glutamate

D. Histidine

7. 4-hydroxy proline (a derivative of proline) is abundantly present in _____

A. Keratin

B. Myoglobin

C. Hemoglobin

D. Collagen

8. Desmosine is a complex derivative of five _____ residues

A. Lysine

B. Arginine

C. Histidine

D. Methionine

9. Isoelectric pH is designated as _____

A. pKa

B. pI

C. Pi

D. None of these

10. Which of the following amino acids is biosynthesized from Ribose 5-phosphate?

A. Histidine

B. Serine

C. Glycine

D. All of these

11. The amino acid biosynthesized from Pyruvate of glycolysis is _____

A. Alanine

B. Valine

C. Leucine

D. All of these

12. Aromatic amino acids (Phenylalanine, Tyrosine, and Tryptophan) are derived from Phosphoenolpyruvate and

A. Ribose 5-phosphate

B. Erythrose-4-phosphate

C. Oxaloacetate

D. α -Ketoglutarate

13. Isoleucine is derived from _____

A. Methionine

B. Threonine

C. Lysine

D. Leucine

14. The blood-clotting protein prothrombin usually contains which of the following modified amino acids?

A. 4-Hydroxy proline

B. 5-Hydroxy lysine

C. 6-N-methyl lysine

D. γ -Carboxy glutamate

15. Cysteine is not an essential amino acid in humans, since we have the machinery to synthesize cysteine from other two amino acids, namely _____ and serine

A. Methionine

B. Selenocysteine

C. Citrulline

D. Hydroxyproline

16. Which of the following contains a disulfide bridge?

A. Cysteine

B. Cystine

C. Methionine

D. None of these

E. All of these

17. Which of the following proteins contain a modified amino acid – desmosine?

A. Keratin

B. Gelatin

C. Elastin

D. Collagen

18. During biosynthesis, Methionine and Threonine are derived from a common intermediate –

A. Chorismate

B. Citrulline

C. Homoserine

D. Cystathionine

19. 6-N-methyl lysine is a derivative of lysine, present in _____

A. Keratin

B. Collagen

C. Myosin

D. Myoglobin

20. A common intermediate branch point in the synthesis of all aromatic amino acids such as Tryptophan, Phenylalanine, and Tyrosine is _____

A. Homoserine

B. Chorismate

C. Cystathionine

D. None of these

21. Sarcosine, a ubiquitous nonproteinaceous amino acid in animals and plants is _____

A. N-methylglycine

B. N-methylvaline

C. N-methylserine

D. N-methylmethionine

AMINO ACID 4

1. pH below pI amino acids will be _____

A. Anionic

B. Cationic

C. Net charge zero

D. No charge

2. Naturally occurring proteins are usually polymers of _____

A. D-amino acids

B. L-amino acids

C. A mixture of D and L amino acids

D. Either D amino acids or L- amino acids

3. At zwitterionic form, an amino acid will act as a _____

A. Proton donor

B. Proton acceptor

C. Proton donor and acceptor

D. None of these

4. Which of the following amino acids is more likely to occupy the interior of a globular protein?

A. Methionine

B. Aspartate

C. Lysine

D. Arginine

E. All of these

5. Proteins absorb UV light at 280 nm and show a characteristic peak at this wavelength. Which amino acid residue in the protein is responsible for this absorption?

A. Methionine

B. Valine

C. Glutamic acid

D. Tryptophan

6. Glycine is _____

A. A stimulatory neurotransmitter

B. An inhibitory neurotransmitter

C. Not acting as a neurotransmitter

D. Both A and B

E. Not a neurotransmitter

7. Selenocysteine is a rare amino acid which contains _____

A. Selenium

B. Selenium and Sulfur

C. Sulfur

D. Selenium and Nickel

8. Which of the following amino acids contain a thioether group in the side chain?

A. Cysteine

B. Cystine

C. Glycine

D. Methionine

9. An amino acid with a sulfhydryl group in the side chain

A. Methionine

B. Cystine

C. Cysteine

D. All of these

10. Which among the following is the largest amino acid?

A. Phenylalanine

B. Tyrosine

C. Tryptophan

D. Histidine

11. Which of the following amino acids is completely nonpolar?

A. Phenylalanine

B. Tyrosine

C. Tryptophan

D. All of these

E. None of these

12. Which amino acid is known as “the 22nd amino acid”?

A. Selenocysteine

B. Pyrrolysine

C. N-formylmethionine

D. Selenomethionine

13. Cystine is ____

A. Highly polar

B. Highly non polar

C. Partially polar

D. Partially non polar

14. The side chain of Histidine contains ____

A. An indole ring

B. A phenol group

C. An imidazole ring

D. A guanidino ring

15. Taurine, the major constituent of bile, is derived from ____

A. Cysteine

B. Methionine

C. Tryptophan

D. Lysine

16. Selenocysteine is derived from ____

A. Cysteine

B. Serine

C. Methionine

D. Cystine

17. An example for selenocysteine containing enzyme

A. Glutathione peroxidase

B. Thioredoxin reductase

C. Glycine reductase

D. All of these

E. None of these

18. A fully protonated glycine ($\text{NH}_3^+\text{—CH}_2\text{—COOH}$) can release ____ protons

A. 1

B. 2

C. 3

D. 4

19. ____ is the only amino acid which is optically inactive

A. Valine

B. Glycine

C. Selenocysteine

D. Proline

20. Selenocysteine is coded by _____ codon

A. UAA

B. UAG

C. UGA

D. AUG