

# Bio202

1) write characteristics of enantiomers?

Stereoisomers that are mirror images of each other are called **enantiomers**. **Enantiomers** have nearly identical chemical properties but differ in a characteristic physical property: their interaction with plane-polarized light. Since they are nonsuperposable mirror images of each other, the two forms represent a class of stereoisomers called **enantiomers**.

2) name two diseases caused by misfolding of proteins?

Misfolding of proteins may occur spontaneously or caused by a mutation in a particular gene, producing an altered protein. In addition, some apparently normal proteins can, after abnormal proteolytic cleavage, take on a unique conformational state. That leads to the formation of long fibrillar protein assemblies consisting of  $\beta$ pleated sheets.

3) what are digestive proteins. Explain with examples?

**Digestive Proteins:** These proteins are digestive enzymes which digest our food materials such as carbohydrates, proteins, lipids and include

Amylase

Pepsin

Lipases etc. (**Pepsin** is one of three principal protein-degrading, or proteolytic, enzymes in the digestive system, the other two being chymotrypsin and trypsin)

4) what are ketogenic amino acids?

**Ketogenic amino acids** Amino acids whose catabolism yields either **acetoacetate or its precursor, (acetyl CoA or acetoacetyl CoA)** are termed **ketogenic**. Acetoacetate is one of the ketone bodies which also include 3-hydroxybutyrate and acetone. **Leucine and lysine** are the only exclusively ketogenic amino acids found in proteins. Their carbon skeletons are not substrates for gluconeogenesis and, therefore, cannot give rise to the net formation of glucose or glycogen in the liver, or glycogen in the muscles.

5) give characteristics of furfural compounds?

Furfural is an important renewable, non-petroleum based, chemical feedstock.) The furfural products thus formed can condense with certain organic phenols ( $\alpha$ -naphthol) to form compounds having characteristic colours. This forms the basis of certain tests used for detection of sugars.

6) Name factors that influence free energy of protein molecules?

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The free energy of a protein molecule is influenced by (1) the hydrophobicity, hydrogen bonds, electrostatic interactions, and (4) the conformational entropy due to the restricted motion

### 7) what do you know about allosteric amino acid?

In [biochemistry](#), **allosteric regulation** (or **allosteric control**) is the regulation of an [enzyme](#) by binding an [effector molecule](#) at a site other than the enzyme's [active site](#). The site to which the effector binds is termed the *allosteric site* or *regulatory site*. Allosteric sites allow effectors to bind to the protein, often resulting in a [conformational change](#) involving [protein dynamics](#). Effectors that enhance the protein's activity are referred to as *allosteric activators*, whereas those that decrease the protein's activity are called *allosteric inhibitors*.

### 8) deffin allotropy?

the existence of two or more different physical forms of a chemical element

### 9) what is HSP60?

Heat shock protein 60 (**HSP60**) is a mitochondrial chaperonin that is typically held responsible for the transportation and refolding of proteins from the cytoplasm into the mitochondrial matrix.

### 10) What are characteristics of furfural comounds?

Infobox references. **Furfural** is an organic compound produced from a variety of agricultural byproducts, including corncobs, oat, wheat bran, and sawdust. The name **furfural** comes from the Latin word furfur, meaning bran, referring to its usual source. **Furfural** is an almond-scented, oily, colorless liquid that turns yellow to dark brown when exposed to air. It is **used as** a solvent for refining lubricating oils, as a fungicide and weed killer and in the production of tetrahydrofuran, an important industrial solvent.

### 11) How Duchenne Muscular Dystrophy is caused?

**DMD** is a genetic disease. Those who inherit it have a defective gene related to a **muscular** protein called dystrophin. This protein keeps **muscle** cells intact. Its absence **causes** rapid **muscular** deterioration as a child with **DMD** grows.

### 12) DiffrencebetwwenHemiacetals and Hemiketals?

The formation of these ring structures is the result of a general reaction between alcohols and aldehydes or ketones to form derivatives called **hemiacetals** or **hemiketals**. Which contain an additional **asymmetric carbon atom** and thus can exist in two stereoisomeric forms

### 13) How misfolding of proteins occur?

**Protein misfolding**: aggregation and amyloid formation. **Protein misfolding** is a common and intrinsic propensity of **proteins** that **occurs** continuously. **Misfolding** is influenced by the amino acid composition, and certain mutations are known to accelerate the process.

### 14) What are monosaccharides? write two examples.



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**Monosaccharides** (simple sugars) are those which cannot be hydrolyzed further into simpler forms. The backbones of common monosaccharides are *unbranched* carbon chains in which all the carbon atoms are linked by single bonds.

15) What are Chaperones and write its main function?

**molecular chaperones** are **proteins** that assist the covalent folding or unfolding and the assembly or disassembly of other macromolecular structures. The reason for this behaviour is that protein folding is severely affected by heat and, therefore, some **chaperones** act to prevent or correct damage caused by misfolding. Other **chaperones** are involved in folding newly made proteins as they are extruded from the ribosome.

16) What are anomers and anomeric carbon?

The **anomeric carbon** is a stereocenter. An important feature is the direction of the OH group attached to the **anomeric carbon**. When the hydrogen is still attached, and the oxygen is not bonded C-O-C, this is called a hemiacetal functional group.

17) What is starch and its structure?

Starch molecules arrange themselves in the plant in semi-crystalline granules. Each plant species has a unique starch granular size: rice starch is relatively small (about 2  $\mu\text{m}$ ) while potato starches have larger granules (up to **100  $\mu\text{m}$** ). Starch becomes soluble in water when heated.

18) What are beta bonds?

**1,4-glycosidic bond**. ... There are two types of glycosidic **bonds** - 1,4  $\alpha$  and 1,4 **beta** glycosidic **bonds**. 1,4  $\alpha$  glycosidic **bonds** are formed when the OH on the carbon-1 is below the glucose ring; while 1,4 **beta** glycosidic **bonds** are formed when the OH is above the plane.

19) What side chain importance of alanine, valine, leucine?

**Role in structure:** **Alanine** is arguably the most boring **amino acid**. It is not particularly hydrophobic and is non-polar. ... **Role in function:** The **Alanine side chain** is very non-reactive, and is thus rarely directly involved in protein **function**. Valine is a **branched-chain amino acid (BCAA)** that works with the other two **BCAAs**, isoleucine and leucine, to promote normal growth, repair tissues, regulate blood sugar, and provide the body with energy. Valine helps stimulate the **central nervous system**, and is needed for proper mental functioning.

Previous studies with Substance P (SP) antagonists (GR 71251, [DPro9, Pro10, Trp11]SP and [DPro9, MeLeu10, Trp11]SP) have suggested the existence in the guinea-pig ileum (GPI) of two distinct tachykinin receptors associated with the contractile responses of [Pro9]SP and septide.

20) What are domains in protein?

A **protein domain** is a conserved part of a given **protein** sequence and (tertiary) structure that can evolve, function, and exist independently of the rest of

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the **protein** chain. Each **domain** forms a compact three-dimensional structure and often can be independently stable and folded.

### 21) What are protein structures?

The primary **structure** of a **protein** refers to the sequence of amino acids in the polypeptide chain. The primary **structure** is held together by peptide bonds that are made during the process of **protein biosynthesis**.

### 22) What are basics of classification of proteins ?

**Protein Classification.** **Proteins** are the macromolecules responsible for the biological processes in the cell. They consist at their most basic level of a chain of amino acids, determined by the sequence of nucleotides in a gene. ... A polypeptide is a chain of amino acids.

### 23) Write a note on transcription?

**Transcription** is the process of producing an **RNA transcript** that is complementary to a **DNA** template. It can be thought of as *DNA-dependent RNA synthesis*.

### 24) what is disaccharide give two examples

A disaccharide (also called a double **sugar** or biose) is the **sugar** formed when two monosaccharides (simple sugars) are joined by glycosidic linkage. Like monosaccharides, disaccharides are soluble in **water**. Three common examples are sucrose, **lactose**, and **maltose**.

### 25) What is quaternary structure of protein?

Many **proteins** are actually assemblies of multiple polypeptide chains. The **quaternary structure** refers to the number and arrangement of the **protein** subunits with respect to one another. Examples of **proteins** with **quaternary structure** include hemoglobin, DNA polymerase, and ion channels.

### 26) how alpha helix stabilize?

The alpha helix is a rod like structure. A tightly coiled backbone forms the inner part of the rod and the side chain extends outwards in a helical manner. The alpha helix is stabilized by hydrogen bonds between the NH and CO groups of the main chain i.e the CO group of each amino acid forms a H-bond with the NH group of the amino acid i.e situated four residues ahead in the sequence

### 27) What is biological importance of carbohydrates?

**Carbohydrates** provide energy to the body, particularly through glucose, a simple sugar that is found in many basic foods. ... As an immediate source of energy, glucose is broken down during the process of cellular respiration, which produces ATP, the energy currency of the cell.

### 28) what is role of iron in binding with heme group in tissues and lung?

### 29) Biomedical importance of protein Which force helps to stability of 3-d structure of protein



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**Protein structure** is the three-dimensional arrangement of atoms in an amino acid-chain molecule. Proteins are polymers – specifically polypeptides – formed from sequences of amino acids, the monomers of the polymer. A single amino acid monomer may also be called a residue indicating a repeating unit of a polymer. Proteins form by amino acids undergoing condensation reactions, in which the amino acids lose one water molecule per reaction in order to attach to one another with a peptide bond. By convention, a chain under 30 amino acids is often identified as a peptide, rather than a protein. ,

30) Example of protein denaturation in our daily life?

**Examples of Denatured Proteins.** Though **protein denaturation** is detrimental for cell survival, it is often encountered in **daily life**. ... Similarly, altering the pH of milk by adding acids such as citric acid from lemon juice denatures milk **proteins** and curdles the milk.

31) what are ketogenic amino acid?

**Ketogenic amino acid.** A **ketogenic amino acid** is an **amino acid** that can be degraded directly into acetyl-CoA, which is the precursor of ketone bodies. This is in contrast to the glucogenic **amino acids**, which are converted into glucose.

32) describe alpha helix or disulphide bridge?

It is a sequence of amino acids. 2. It is a linear polymer: linking the alpha-carboxyl group of one amino acid to the alpha amino group of another amino acid => PEPTIDE BOND (covalent bond). 3. In some proteins, the linear polypeptide chain is cross-linked: Disulfide bonds. The primary structure is a polypeptide, in which:

- + each amino acid in the peptide is a residue.
- + there is a regularly repeating segment called the main chain or backbone, and a variable part, comprised of the side chain.

33) What are allosteric form of hemoglobin ?

Allostery in **haemoglobin**. **Haemoglobin** is an **allosteric** protein. ... In fact the binding of oxygen to one **haemoglobin** subunit induces conformational changes (discussed before) that are relayed to the other subunits, making them more able to bind oxygen by raising their affinity for this molecule.

34) What is titration curve of glycine?

The end point of a **titration curve** represents the observed end of the **titration**. ... In this experiment we are finding out the **titration curve** of the amino acid **Glycine**. **Glycine** is a diprotic amino acid which means that it has two dissociable Protons, one on the  $\alpha$  amino group and the other on the carboxyl group.

35) What are Motif of protein?

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In a chain-like biological molecule, such as a protein or nucleic acid, a structural motif is a **supersecondary** structure, which also appears in a variety of other molecules. Motifs do not allow us to predict the biological functions: they are found in proteins and enzymes with dissimilar **functions**.

### 36) What is Equilibrium constant of reversible reaction?

There is a simple relationship between the **equilibrium constant** for a **reversible reaction** and the rate **constants** for the forward and reverse **reactions** if the mechanism for the **reaction** involves only a single step. ... This equation can be rearranged to give the **equilibrium constant** expression for the **reaction**.

### 37) Difference btw secondary and tertiary structure of proteins

Explain the **differences between** primary, **secondary and tertiary protein structure**. Primary **structure** is the order in which what amino acid is bound the other **with a** peptide bond. This is coded for by the order of codons **in a** gene. ... This **structure** is determined by hydrogen bonds **between the different** amino acids

### 38) Define electrostatic forces in protein interactions?

Protein electrostatic properties stem from the proportion and distribution of polar and charged residues. Polar and charged residues regulate the electrostatic properties by forming **short-range interactions**, like **salt-bridges** and **hydrogen-bonds**, and by defining the over-all electrostatic environment in the protein. Electrostatics play a major role in defining the mechanisms of protein-protein complex formation, molecular recognitions, thermal stabilities, conformational adaptabilities and protein movement

### 39) Write the side properties of Glutamate and Alanine ?

### 40) Domain in Protein and their function?

A **protein domain** is a conserved part of given **protein** sequence and (tertiary) structure that can evolve, **function**, and exist independently of the rest of the **protein** chain. ... Many **proteins** consist of several structural **domains**.

One **domain** may appear in a variety of **different proteins**.

### 41) Explain the single letter naming symbol in Amino acids?

## SHORTHAND SYMBOLS FOR AMINO ACIDS

[1-letter symbols are commonly used in sequence data]

One letter	Three letter	Amino Acid
A	Ala	Alanine
R	Arg	Arginine

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N	Asn	Asparagine
D	Asp	Aspartic acid
B	Asx	Asn or Asp

42) Hsp60 importance of protein structure forces responsible for 3 d structure of protein why a helix disturb due 2 peresenceovseline what are ketogenic amino acid

43) Write the name of Essential amino acids?

here are 10 essential amino acids: arginine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine.

44) What are propertise of proteins?

Proteins are compounds found in all living cells, in animals and plants. They play a variety of important roles and are essential to maintain the structure and function of all lifeforms. The word 'protein' is derived from the Greek word protos, meaning "primary" or "first". Proteins are vital for the growth and repair, and their functions are endless. Each and every property that characterizes a living organism is affected by proteins, whether it is a bacteria or a human body

Proteins  $\xrightarrow{\text{hydrolysis}}$  Peptides  $\xrightarrow{\text{hydrolysis}}$  Amino acids.

45) discuss the steps of protien folding?

There are four **stages of protein folding**, primary, secondary, tertiary and quarternary. The secondary structure is the **protein** beginning to **fold** up. It can have two types of structure: the alpha helix, a coil shape held by hydrogen bonds in the same direction as the coil.

46) what are osazone?

**Osazones** are a class of carbohydrate derivatives found in organic chemistry formed when sugars are reacted with excess of phenylhydrazine. The famous German chemist Emil Fischer developed and used the reaction to identify sugars whose stereochemistry differed by only one chiral carbon

47) What are monosaccharides equation reaction?

48) What are allosteric form of hemoglobin ?

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