

SAMPLE CONTENT

FOUNDATION



MHT-CET

BIOLOGY

From vision to victory

- Based on Latest Paper Pattern
- Grasp the Terminology
- Key Notes for Good Practice
- Quick Review
- Previous Years' Questions

Includes
Authentic
Questions from
Latest MHT-CET
Examination

Std. XI

Target Publications[®] Pvt. Ltd.

XI
Foundation
MHT-CET
BIOLOGY MULTIPLE CHOICE
QUESTIONS

Target Publications

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— ◆ ◆ ◆ CONTENTS ◆ ◆ ◆ —

Sr. No.	Textbook Chapter No.	Chapter Name	Page No.
1	6	Biomolecules	
2	13	Respiration and Energy Transfer	
3	14	Human Nutrition	
4	15	Excretion and Osmoregulation	
17	•	Solutions	

Target Publications

Biomolecules

Grasp the Terminology

Term	Meaning
Glycosidic bond	A covalent bond that links two sugar molecules together.
Reducing sugar	A sugar that can reduce other compounds and is oxidized in the process.
Peptide bond	A covalent bond that links two amino acids together.
Denaturation	The process by which a protein loses its three-dimensional structure and function due to external factors such as heat or pH changes.

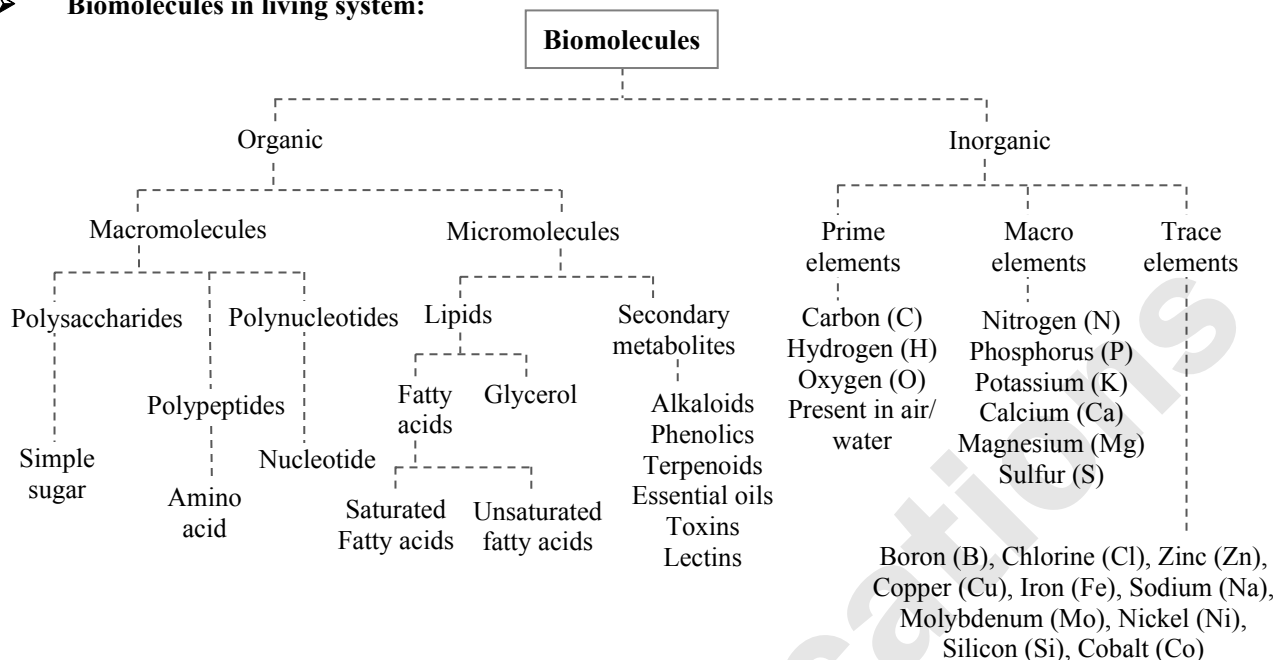
Key Notes For Good Practice

- Many biomolecules, such as enzymes and DNA, rely on non-covalent interactions, such as hydrogen bonds and van der Waals forces, to maintain their structure and function. Failing to understand the role of these interactions can lead to misunderstandings about biomolecule function.
- Biomolecules rarely function in isolation, and the interactions between different biomolecules can have a significant impact on biological processes.
- The structure of biomolecules determines their function, and changes in structure can affect their function and the overall health of an organism.
- Biomolecules can be broken down and recycled by organisms through various metabolic pathways. Many biomolecules are produced through the process of biosynthesis, where cells use enzymes to combine simple molecules into more complex ones.
- Drawing and labeling biomolecule structures is a great way to reinforce your understanding of their structures and functions.



Quick Review

➤ **Biomolecules in living system:**



➤ **Classification of Carbohydrates:**

Monosaccharides		
Type	Example	No. of carbon atoms
Triose	Glyceraldehyde	3
Tetrose	Erythrose	4
Pentose	Ribose	5
	Deoxyribose	
Hexose	Glucose	6
	Fructose	
	Galactose	
Heptose	Sedoheptulose	7

Disaccharides	
Example	Composition
Sucrose (Cane sugar)	Glucose + Fructose
Lactose (Milk sugar)	Glucose + Galactose
Maltose (Malt sugar)	Glucose + Glucose

Polysaccharides	
Homopolysaccharides	
Starch	Polymer of α -glucose (Amylose: unbranched helical structure, Amylopectin: branched)
Cellulose	Polymer of β -glucose (Straight chain with β -1,4-glycosidic linkages)
Glycogen	Polymer of α -glucose (Highly branched structure with shorter distances between side chains)
Heteropolysaccharides	
Hyaluronic acid, Heparin, Blood group substances, Chondroitin sulphate	

➤ **Classification of fatty acids:**

Types	Description	Examples
Saturated fatty acids (typically solid at room temperature)	They contain single chain of carbon atoms with single bonds.	Palmitic acid and stearic acid

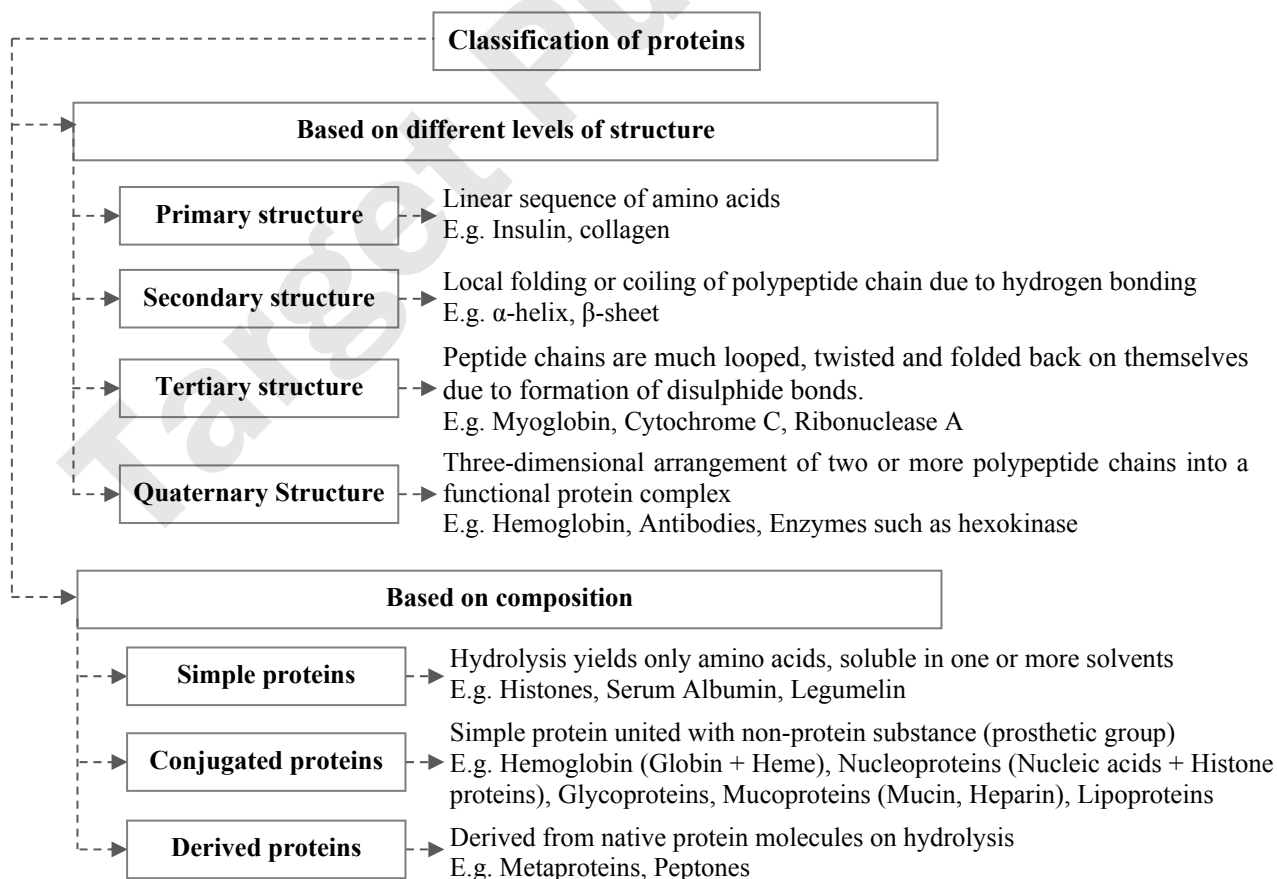


Unsaturated fatty acids (typically liquid at room temperature)	Organic acids composed of hydrocarbon chain with one double bond between carbon atoms	Oleic acid
	Organic acids composed of hydrocarbon chain with two or more double bond between carbon atoms	Linoleic acid

➤ **Classification of Lipids:**

Types	Description	Examples
Simple lipids	Fats: Esters of fatty acids with glycerol.	Triglycerides (3 molecules of fatty acids and 1 molecule of glycerol)
	Waxes: Esters of long chain fatty acids with long chain alcohols.	Wax in beehive
Compound lipids	Phospholipids: Have both hydrophilic polar groups and hydrophobic non-polar groups; found in cell membrane.	Lecithin
	Glycolipids: Contain glycerol, fatty acids, and simple sugars such as galactose; found in the brain white matter and myelin sheath	Cerebrosides
Derived lipids (Sterols)	Composed of fused hydrocarbon rings (steroid nucleus) and a long hydrocarbon side chain	Cholesterol (Used to synthesis adrenocorticoids, progesterone, testosterone, and vitamin D)
		Phytosterols (Found in plants)

➤ **Classification of Proteins:**





Caution

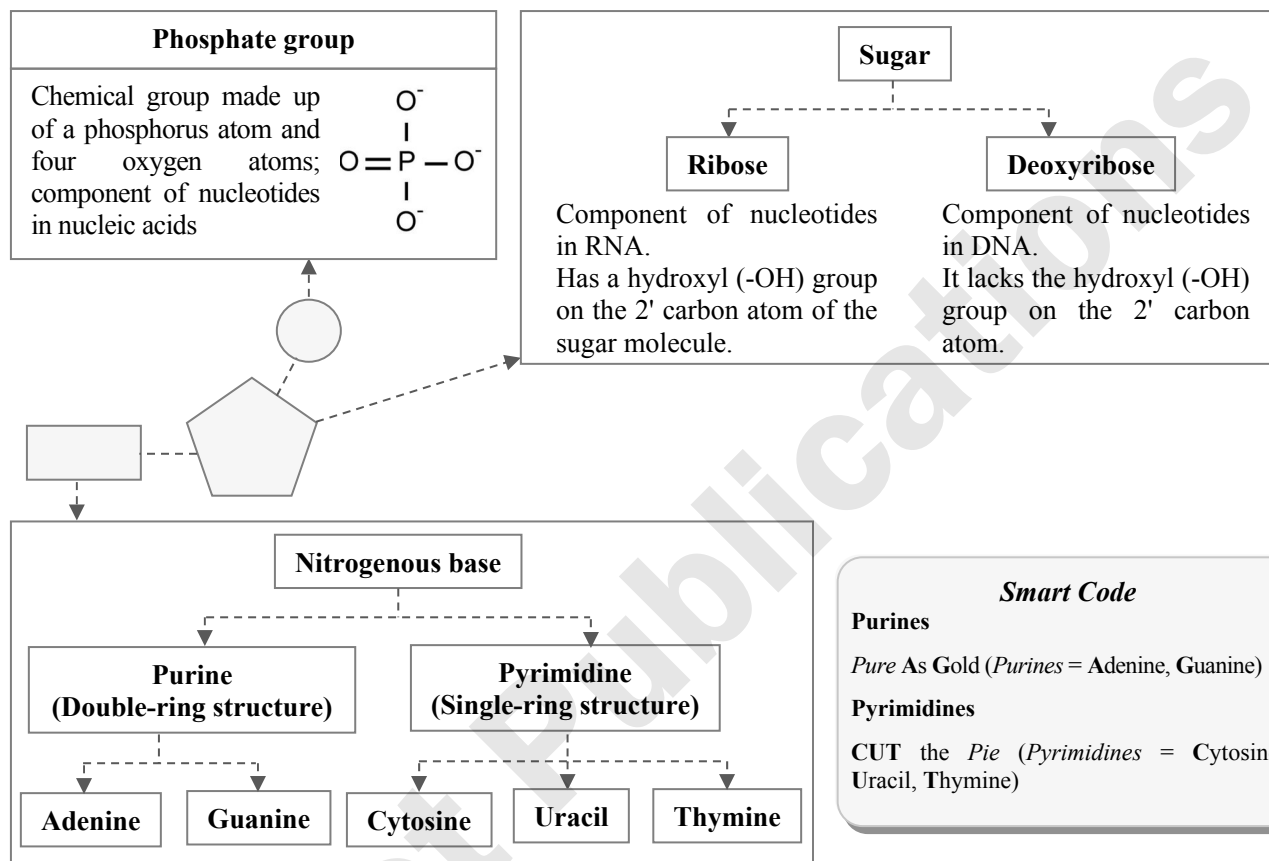
Insulin: Hormone secreted by the pancreas that helps to regulate blood sugar levels.

Inulin: Naturally occurring polysaccharide found in different types of plants. Generally used as a prebiotic.

Students can scan the adjacent QR code in *Quill - The Padhai App* to get conceptual clarity on Characteristics of Proteins.



➤ **Components of Nucleic Acids:**





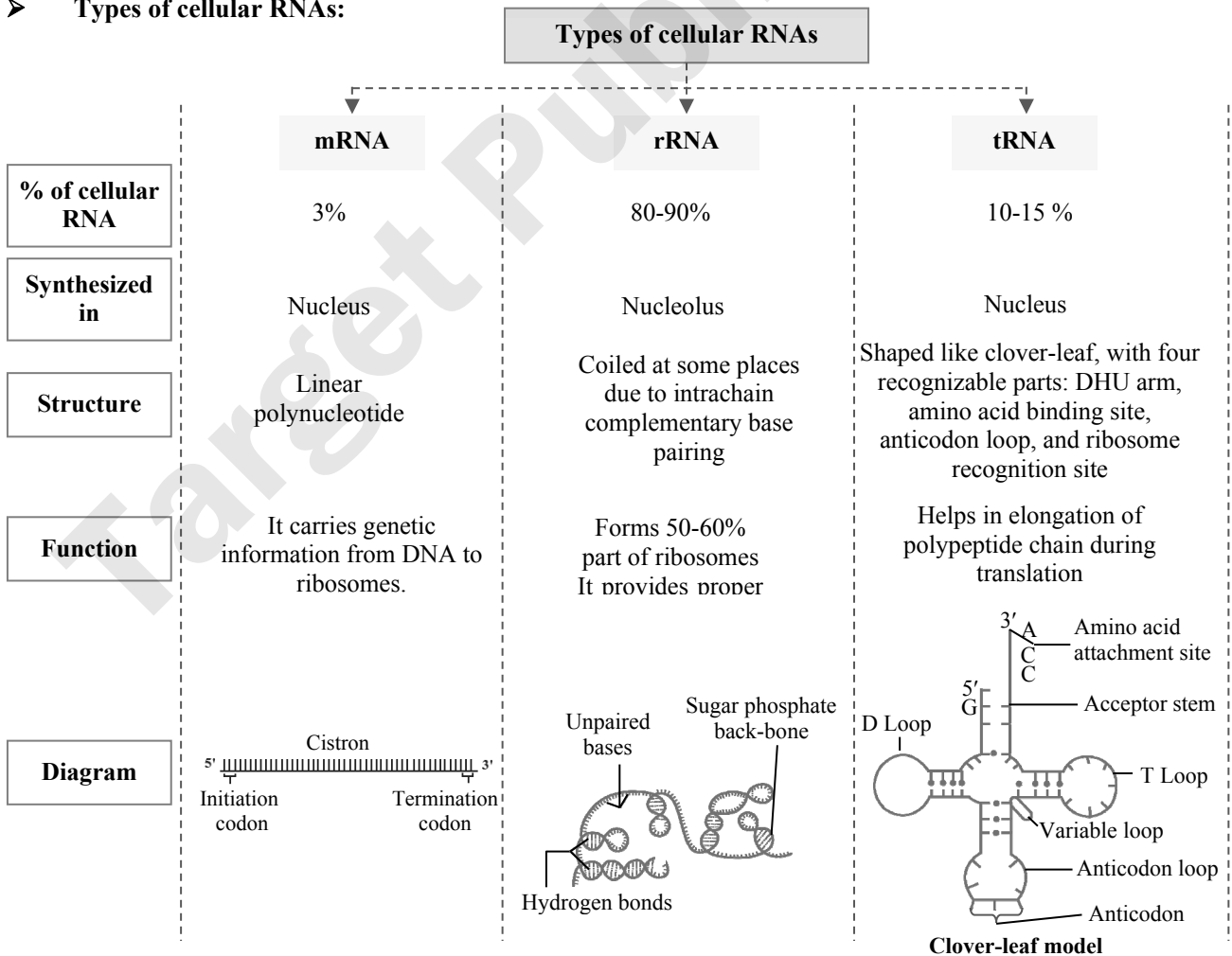
Diameter	20 Å
No. of base pairs/turn	About 10
Length of one turn	34 Å
Distance between nucleotides	3.4 Å

Caution
Bacteriophage ϕ x 174 and several bacterial viruses have ssDNA

➤ **Ribonucleic Acid (RNA):**

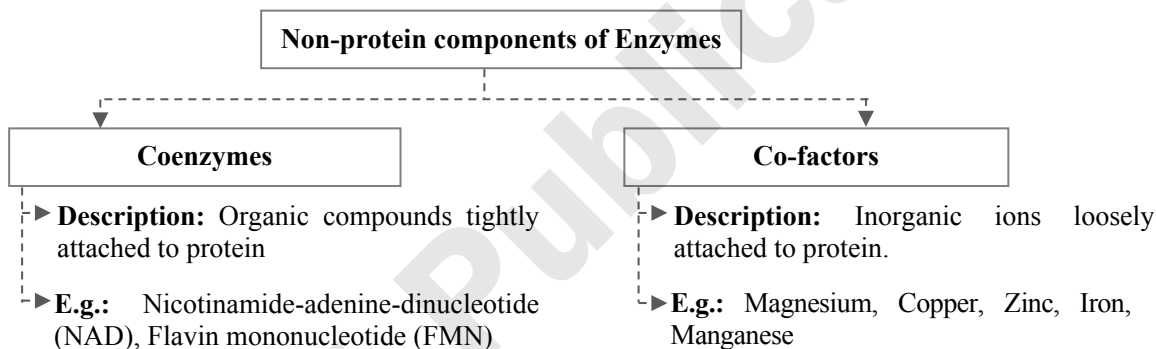
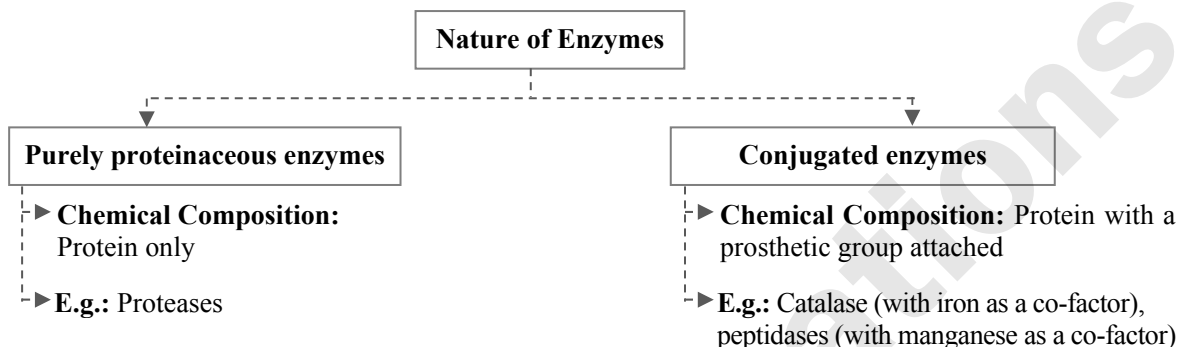
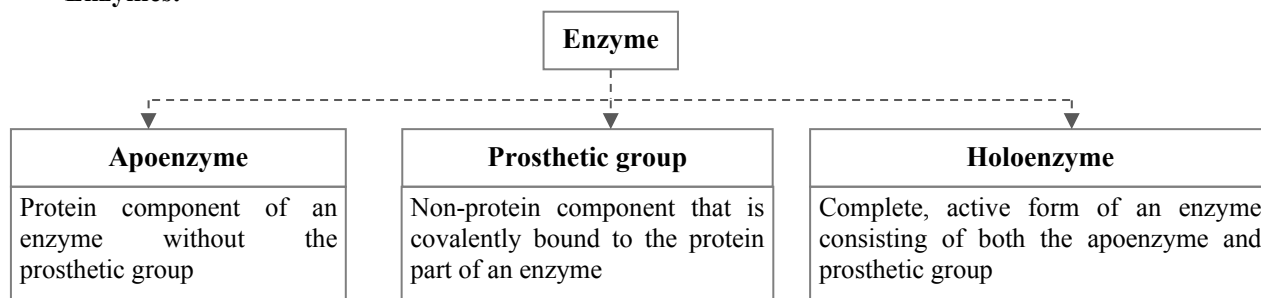
Features	Description
Structure	Single-stranded polynucleotide chain (can be double-stranded in some viruses)
Sugar	Ribose sugar
Base pairs	Uracil substitutes thymine; purine-pyrimidine equality not found due to single-stranded structure
Folding	RNA strand can fold upon itself in certain regions or entirely, aiding stability
Start codons	Most of the RNA polynucleotide chains start with either adenine or guanine

➤ **Types of cellular RNAs:**

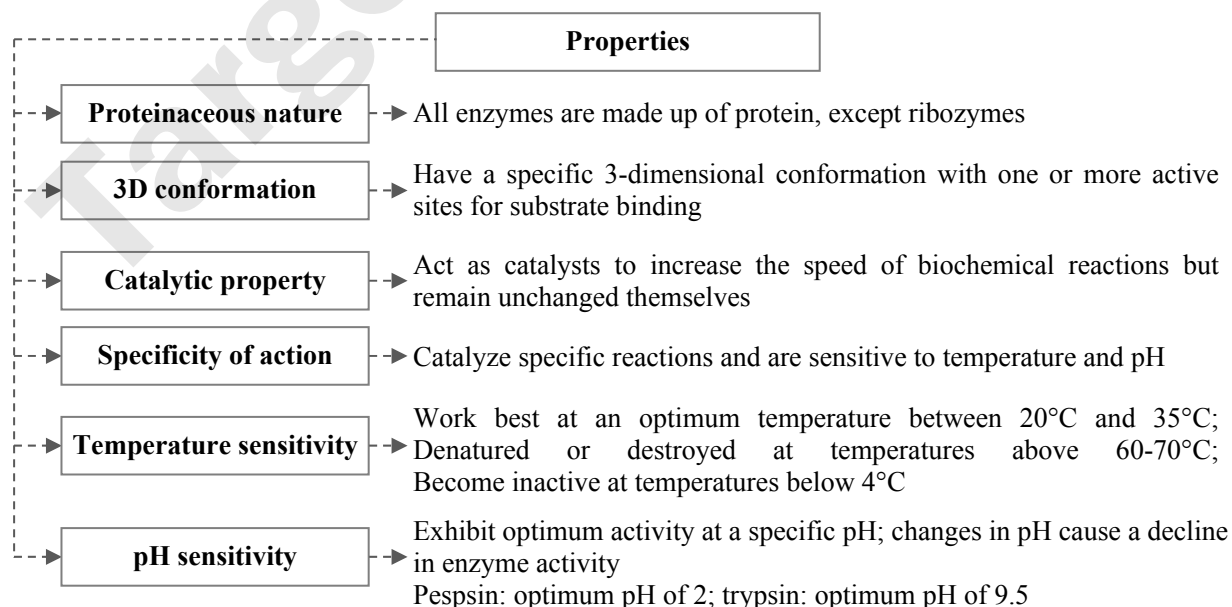




➤ **Enzymes:**



➤ **Properties of Enzymes:**



**Caution**

All proteins are NOT enzymes, but all enzymes are proteins, EXCEPT ribozymes. Ribozymes are nucleic acids that behave like enzymes and have catalytic property.



Students can scan the adjacent QR code in *Quill - The Padhai App* to get conceptual clarity on Nomenclature of Enzymes.

Caution

Enzymes often end with the suffix '-ase', whereas sugars generally end with the suffix '-ose'.

➤ **Classification of Enzymes:**

Enzyme Class	Description	Example	Reaction
Oxidoreductases	Catalyze redox reactions by transferring hydrogen and/or oxygen	Alcohol dehydrogenase	Alcohol + NAD ⁺ ↓ Aldehyde + NADH ₂
Transferases	Transfer specific groups between molecules	Glucokinase	Glucose + ATP ↓ Glucose-6-Phosphate + ADP
Hydrolases	Catalyze hydrolysis reactions	Sucrase	Sucrose + H ₂ O ↓ Glucose + Fructose
Lyases	Catalyze reactions that leave a double bond by removing atoms from substrate molecules	Histidine decarboxylase	Histidine ↓ Histamine + CO ₂
Isomerases	Catalyze rearrangements of molecular structures	Isomerase	Glucose-6-Phosphate ↓ Fructose-6-Phosphate
Ligases or Synthetases	Catalyze the formation of covalent bonds between molecules, powered by energy from ATP or GTP hydrolysis	Pyruvate carboxylase	Pyruvate + CO ₂ + ATP ↓ Oxaloacetate + ADP + P _i

Smart Code

On The HILL

O – Oxidoreductases, T – Transferases, H – Hydrolases, I – Isomerases, L – Lyases, L – Ligases

Students can scan the adjacent QR code in *Quill - The Padhai App* to get conceptual clarity on Mechanism of Enzyme Action.

➤ **Models of Enzyme Action:**

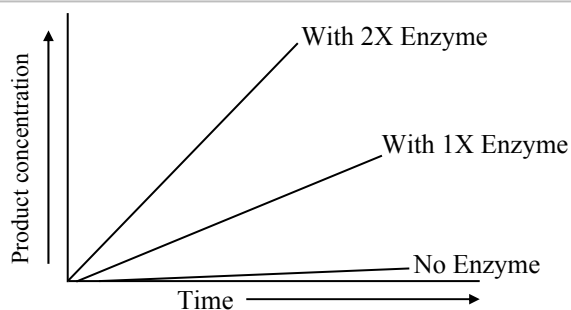
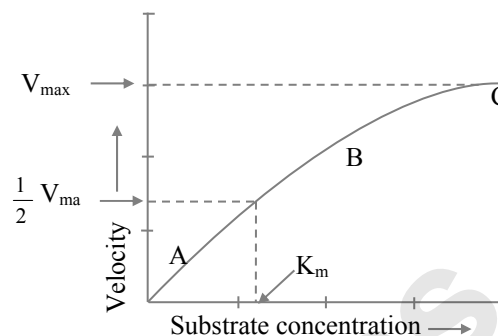
	Lock and Key model	Induced Fit model
Proposed by	Emil Fischer, 1894	Koshland, 1959
Description	Enzyme is lock, substrate is key	Substrate induces conformational change in enzyme
Key Concept	Only correctly sized substrate fits into active site	Active site continually reshapes by interactions with substrate
Enzyme structure	Rigid structure	Flexible structure
Acceptance	Less accepted model	More accepted model



➤ **Factors Affecting Enzyme Activity:**

Substrate concentration

- Increase in substrate concentration gradually increases enzyme activity within a limited range
- Rectangular hyperbola is obtained when velocity is plotted against the substrate concentration
- Low K_m value indicates strong affinity between enzyme and substrate, high K_m value reflects weak affinity

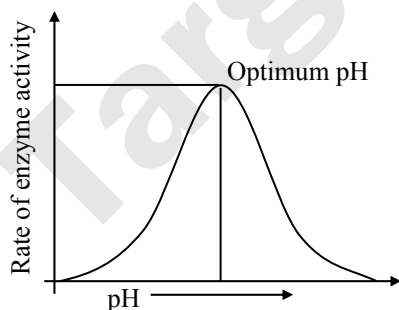
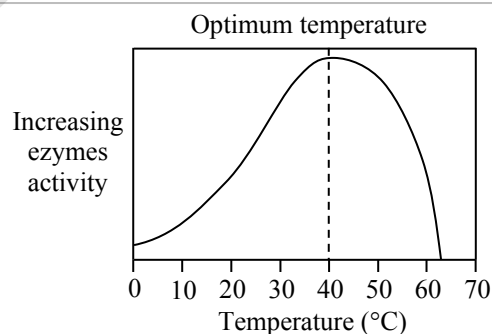


Enzyme concentration

- Directly proportional to the rate of enzymatic reaction
- The rate of reaction is also directly proportional to the square root of the concentration of enzymes.

Temperature

- The enzymatic reaction occurs best at or around 37°C
- Enzymes rapidly denature at temperature above 40°C
- Optimum temperature is the temperature at which enzymes show maximum activity



pH

- Enzyme catalyzes reaction at the maximum rate at an optimum pH
- Every enzyme has a different optimum pH value
- The enzyme cannot perform its function beyond the range of its pH value

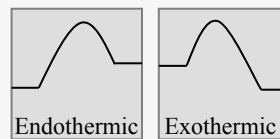
Other substances

- Enzyme activity is affected by the presence of co-enzymes, activators, and inhibitors
- Activators are inorganic substances that increase enzyme activity, while inhibitors retard enzyme activity
- Most enzymes are a combination of a co-enzyme and an apo-enzyme

**Caution**

Endothermic vs. Exothermic reactions: Endothermic reaction absorbs heat, whereas exothermic reactions release heat and are spontaneous.

In case of graphs: Imagine the 'humps of a camel'. Up the hump represents an endothermic reaction whereas, down the other side of the hump represents an exothermic reaction.



Students can scan the adjacent QR code in *Quill - The Padhai App* to get conceptual clarity on Concept of Metabolism.

➤ **Secondary metabolites (SMs):**

Terpenes	Composed mainly of carbon and hydrogen, made from mevalonic acid	e.g. Carotenoids, rubber
Phenolics	Made from simple sugars containing benzene rings, hydrogen and oxygen	e.g. Flavonoids, tannins
Nitrogen-containing compounds	May also contain sulfur, highly diverse class	e.g. Alkaloids, cyanogenic glycosides,

Students can scan the adjacent QR code in *Quill - The Padhai App* to get conceptual clarity on Secondary metabolites (SMs).

**Classical Thinking****6.0 Introduction**

- What is the main purpose of studying biochemistry?
 - To learn about inorganic chemistry
 - To understand the chemical properties of non-living things
 - To develop a foundation for understanding biological processes and communication within and between cells
 - To study the structure and behavior of subatomic particles
- What is the term used to describe the large molecules formed by the union of subunits such as sugars, amino acids, and nucleotides?
 - Bio-elements
 - Micromolecules
 - Macromolecules
 - Biomolecules

- Which type of macromolecule are lipids?
 - Water-soluble and high molecular weight compounds.
 - Water-insoluble and small molecular weight compounds.
 - Water-soluble and small molecular weight compounds.
 - Water-insoluble and high molecular weight compounds.

6.1 Biomolecules in the Cell**Carbohydrates**

- What are the three elements that make up carbohydrates?
 - Carbon, oxygen, and nitrogen
 - Carbon, hydrogen, and oxygen
 - Carbon, nitrogen, and sulfur
 - Carbon, phosphorus, and oxygen



2. What is the ratio of hydrogen and oxygen atoms in carbohydrates?
(A) 1:1 (B) 1:2 (C) 2:2 (D) 2:1
3. Which of the following do not give smaller sugar units on hydrolysis?
(A) Monosaccharides (B) Disaccharides
(C) Polysaccharides (D) Glycogen
4. Carbohydrates are biomolecules made from just three elements: carbon, hydrogen and oxygen with the general formula _____.
(A) $C_x(HO)_y$ (B) $C_x(H_2O)_y$
(C) $C_x(H_2)_y$ (D) $C_x(O_2)_y$
5. Match the following and select the correct option.

	Column I (Sugars)		Column II (No. of Carbons)
i.	Erythrose	a.	Five
ii.	Glucose	b.	Four
iii.	Ribose	c.	Seven
iv.	Sedoheptulose	d.	Six

- (A) i – a, ii – c, iii – d, iv – b
(B) i – a, ii – b, iii – c, iv – d
(C) i – b, ii – c, iii – d, iv – a
(D) i – b, ii – d, iii – a, iv – c
6. Disaccharide is formed when two monosaccharides react by condensation reaction releasing a _____ molecule.
(A) CO_2 (B) water
(C) hydrogen (D) CO
7. Concentration of glucose in the human blood is about _____ of blood.
(A) 90gm per 100ml
(B) 90mg per 100ml
(C) 90mg per 10ml
(D) 90mg per 1000ml
8. Which of the following bond holds the two monosaccharide units together?
(A) Sulphide bond (B) Glycosidic bond
(C) Peptide bond (D) Disulphide bond
9. Which of the following is a stored food in the plants?
(A) Glucose (B) Starch
(C) Cellulose (D) Glycogen
10. Starch and cellulose are the compounds made up of many units of
(A) Simple sugar (B) Fatty acid
(C) Glycerol (D) Amino acid
11. Identify the two types of glucose polymers present in starch.
(A) Amylose and glycogen
(B) Amylose and amylopectin
(C) Amylopectin and glycogen
(D) Cellulose and amylopectin

12. Which of the following correctly describes the two types of polysaccharides?
(A) **Homopolysaccharides:** It contains same type of amino acids.
Heteropolysaccharides: It contains two or more different monosaccharides.
(B) **Homopolysaccharides:** It contains same type of monosaccharides.
Heteropolysaccharides: It contains two or more different monosaccharides.
(C) **Homopolysaccharides:** It contains same type of monosaccharides.
Heteropolysaccharides: It contains two or more different nucleotides.
(D) **Homopolysaccharides:** It contains same type of nucleotides.
Heteropolysaccharides: It contains two or more different amino acids.

13. _____ serves to form the cell walls in plant cells.
(A) Cellulose (B) Starch
(C) Glycogen (D) Amylopectin

14. Match the columns and select the correct option.

	Column I		Column II
i.	Starch	a.	Animal storage molecule
ii.	Cellulose	b.	Plant storage molecule
iii.	Glycogen	c.	Heparin
iv.	Heteropoly-saccharide	d.	Plant cell wall component

- (A) i – a, ii – c, iii – d, iv – b
(B) i – a, ii – b, iii – c, iv – d
(C) i – b, ii – c, iii – d, iv – a
(D) i – b, ii – d, iii – a, iv – c
15. The exoskeleton of insects is made up of chitin which is a _____.
(A) mucoprotein (B) lipid
(C) lipoprotein (D) polysaccharide

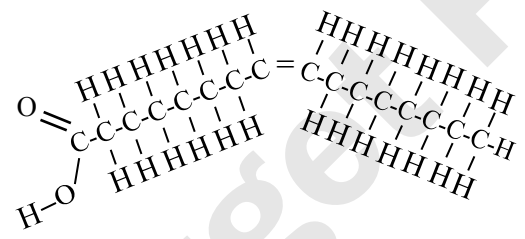
Lipids

16. In lipids, _____ ratio is greater than 2:1
(A) carbon to oxygen
(B) hydrogen to oxygen
(C) oxygen to nitrogen
(D) sulphur to oxygen
17. _____ are water insoluble and small molecular weight compounds as compared to macromolecules.
(A) Lipids (B) Proteins
(C) Carbohydrates (D) Nucleic acids
18. Fats are esters of fatty acids with _____.
(A) glycerol ($CH_2OH-CHOH-CH_2OH$)
(B) glycerol ($CH_3OH-CHOH-CH_2OH$)
(C) glycerol ($CH_2OH-CHOH-CHOOH$)
(D) glycerol ($CH_2OH-COH-CH_2OH$)



19. Unsaturated fats are liquid at room temperature and are called _____.
- (A) oils (B) glycolipids
(C) phospholipids (D) waxes
20. Phospholipids have _____.
- (A) only hydrophilic polar groups
(B) only hydrophobic non-polar groups
(C) both hydrophilic polar groups and hydrophobic non-polar groups
(D) phytosterols
21. Match the columns and select the correct option.

	Column I		Column II
i.	Simple lipids	a.	Cholesterol
ii.	Compound lipids	b.	Vanaspati ghee
iii.	Sterols	c.	Glycerol
		d.	Lecithin

- (A) i – a, ii – c, iii – d
(B) i – a, ii – b, iii – c
(C) i – b, ii – c, iii – d
(D) i – b, ii – d, iii – a
22. Fatty acids which do not contain double bond between carbon atoms are
- (A) saturated fatty acids
(B) unsaturated fatty acids
(C) esters of glycerol
(D) polymers of triglycerides
23. Which type of fatty acid is represented in the following structure?
- 
- (A) Saturated fatty acid
(B) Amphipathic fatty acid
(C) Unsaturated fatty acid
(D) Glycerol
24. Large amounts of _____ have been found in the brain white matter and myelin sheath.
- (A) adrenocorticoids (B) cerebroside
(C) oleic acids (D) mucoproteins
25. Which of the following are the examples of unsaturated fatty acids?
- (A) Oleic acid (B) Linoleic acid
(C) Glycerol (D) Both (A) and (B)
26. Yam Plant (*Dioscorea*) produces a steroid compound called _____.
- (A) diosgenin (B) adrenocorticoid
(C) progesterone (D) estrogen

Proteins

27. The term 'Protein' was coined by
- (A) Schleiden (B) M. Wilkins
(C) Berzelius (D) Luca Ghini
28. Proteins
- (A) are micromolecules
(B) are macromolecules
(C) have low molecular weight
(D) are found in small quantity in the cell
29. Proteins consist of
- (A) carbon, hydrogen, chlorine, sulphur
(B) carbon, hydrogen, oxygen, nitrogen
(C) carbon, manganese, phosphorus, nitrogen
(D) carbon, iodine, oxygen and inorganic phosphate
30. In proteins, amino acids are linked together by _____ bonds which join the carboxyl group of one amino acid residue to the amino group of another residue.
- (A) glycosidic (B) peptide
(C) ester (D) phosphodiester
31. Which of the following are the two types of secondary structure of proteins?
- (A) δ -helix and β -pleated sheets
(B) α -helix and β -pleated sheets
(C) β -helix and α -pleated sheets
(D) β -helix and δ -pleated sheets
32. Complete the analogy and select the correct option.
- α -helix structure : Keratin :: β -pleated sheet :
- (A) Phospholipids (B) Silk fibres
(C) Palmitic acid (D) Lecithin
33. Proteins are _____ in nature.
- (A) hydrophilic (B) hydrophobic
(C) amphoteric (D) polar
34. A protein consisting of more basic amino acids such as _____, exists as a cation at the physiological pH of 7.4. Such proteins are called basic proteins.
- (A) lysine and aspartic acid
(B) methionine and arginine
(C) lysine and arginine
(D) proline and cysteine
35. Histones of _____ are basic proteins.
- (A) chromoproteins (B) nucleoproteins
(C) phytoproteins (D) mucoproteins
36. Histones are involved in packaging of DNA into structural units called _____.
- (A) nucleotides (B) nucleosides
(C) nucleosomes (D) chromatin



37. Conjugated proteins consist of a simple protein united with some non-protein substance. The non-protein group is called _____.
 (A) mucoprotein (B) lipoprotein
 (C) prosthetic group (D) globin
38. Identify the examples of derived proteins.
 (A) Metaproteins, haemoglobin
 (B) Haemoglobin, peptones
 (C) Metaproteins, peptones
 (D) Mucoproteins, peptones
- Nucleic Acids**
39. In 1924, Feulgen showed that _____ contain DNA.
 (A) nucleosomes (B) chromosomes
 (C) chromophores (D) histones
40. A nucleotide contains
 (A) sugar + phosphate
 (B) N-base + phosphate
 (C) sugar + nitrogenous base
 (D) sugar + N-base + phosphate
41. Which one of the following pairs of nitrogenous bases of nucleic acids, is wrongly matched with the category mentioned against it?
 (A) Guanine, Adenine – Purines
 (B) Adenine, Thymine – Purines
 (C) Thymine, Uracil – Pyrimidines
 (D) Uracil, Cytosine – Pyrimidines
42. The base pairs of DNA are correctly shown as
 (A) $A \equiv T$ and $C = G$
 (B) $A = T$ and $C = G$
 (C) $A = T$ and $C \equiv G$
 (D) $A \equiv T$ and $C \equiv G$
43. Complementary strands of DNA molecule are (i) and held together by (ii).
 (A) i – parallel, ii – peptide bond
 (B) i – antiparallel, ii – hydrogen bond
 (C) i – linear, ii – glycosidic bond
 (D) i – cyclic, ii – peptide bond
44. The amount of purines is equal to the amount of pyrimidines was suggested by
 (A) Robert Brown (B) Miescher
 (C) Chargaff (D) Khorana
45. Nitrogen bases are attached by
 (A) peptide bonds
 (B) phosphodiester bonds
 (C) hydrogen bonds
 (D) glycosidic bonds
46. In a DNA strand, the nucleotides are linked together by
 (A) glycosidic bonds
 (B) phosphodiester bonds
 (C) peptide bonds
 (D) hydrogen bonds
47. The two strands of DNA complete a turn at a vertical distance of
 (A) 20 Å (B) 10 Å
 (C) 34 Å (D) 3.4 Å
48. Distance between two successive base pairs of a DNA molecule is
 (A) 6.8 Å or 0.034 nm
 (B) 4.3 Å or 3.4 nm
 (C) 3.4 Å or 0.34 nm
 (D) 4.4 Å or 44 nm
49. Watson and Crick are known for their discovery of
 (A) single stranded DNA
 (B) triple stranded DNA helix
 (C) double stranded helix
 (D) double stranded RNA
50. RNA contains
 (A) hexose sugar
 (B) deoxyribose sugar
 (C) dextrose sugar
 (D) ribose sugar
51. RNA is genetic material in
 (A) bacteria (B) cyanobacteria
 (C) fungi (D) plant viruses
52. Which RNA is present in more amount in the cell?
 (A) m-RNA (B) t-RNA
 (C) r-RNA (D) soluble RNA
53. Which of the following bases is present in RNA in place of thymine?
 (A) Uracil (B) Adenine
 (C) Guanine (D) Cytosine
54. t-RNA molecules are much smaller consisting of _____ nucleotides.
 (A) 700-800 (B) 70-80
 (C) 7-8 (D) 200-300
- Enzymes**
55. The word 'enzyme' means
 (A) in maize (B) in rice
 (C) in yeast (D) *in vivo*
56. The enzymes which act within the cell in which they are synthesized are known as _____.
 (A) exo-enzymes (B) apo-enzymes
 (C) holo-enzymes (D) endo-enzymes
57. The enzymes which act outside the cell of which they are synthesized are known as _____.
 (A) exo-enzymes (B) endo-enzymes
 (C) ribozymes (D) apo-enzymes
58. _____ is non-protein in nature and is attached to the protein component of enzyme by chemical bonds.
 (A) Aldehyde group (B) Ketone group
 (C) Prosthetic group (D) Amino group



59. According to lock and key model postulated by Emil Fischer,
- key is the enzyme and lock is the substrate.
 - lock is the enzyme and key is the substrate.
 - a substrate induces a conformational change in the enzyme.
 - enzymes are flexible structures in which the active site continually reshapes.

6.2 Concept of Metabolism

1. Which reaction releases energy as large molecules are broken down into small molecules?
- Anabolic reaction
 - Catabolic reaction

- Dehydration reaction
 - Metabolic reaction
2. Which reaction combines small molecules to form large molecules?
- Anabolic reaction
 - Catabolic reaction
 - Redox reaction
 - Hydrolytic reaction
3. Morphine is the alkaloid isolated from _____.
- Pisum sativum*
 - Hibiscus rosa sinensis*
 - Papaver somniferum*
 - Azadirachta indica*

MHT-CET Previous Years' Questions

1. A 340 Å long segment of DNA molecule has 20 thymine nitrogenous bases, what will be the number of guanine nitrogen bases in the same segment? [2015]
(A) 10 (B) 40 (C) 80 (D) 160
2. Enzymes can react with acidic or basic substances due to their _____ nature. [2019]
(A) Amorphous (B) Competitive
(C) Colloidal (D) Amphoteric
3. Which one of the following sugar does NOT have same empirical formula as that of carbohydrate? [2019]
(A) Maltose (B) Galactose
(C) Digitoxose (D) Glycogen
4. Which one of the following is generally applicable to polysaccharides? [2020]
(A) Crystalline, insoluble, tasteless
(B) Amorphous, soluble, sweet
(C) Crystalline soluble sweet
(D) Amorphous, insoluble, tasteless
5. Disaccharides are formed from two monosaccharides by the process of _____. [2020]
(A) Polymerization (B) Hybridization
(C) Hydrogenation (D) Condensation
6. The rate of enzyme reactions rises with the increase in substrate concentration. But it does NOT increase beyond a certain concentration because _____. [2020]
(A) The enzymes undergo denaturation.
(B) Free enzyme molecules to bind with substrate are not available.
(C) The substrate molecules are available.
(D) The reaction has to maintain a minimum velocity.
7. Carbohydrate molecules are characterized by any one of the following groups EXCEPT [2020]
(A) Aldehyde (HO)
(B) Carboxyl (COOH)
(C) Ketone (C = O)
(D) Hydroxyl (OH)
8. Which one of the following can form a nucleotide of DNA? [2020]
(A) Thymine + ribose + phosphate
(B) Uracil + ribose + phosphate
(C) Adenine + deoxyribose + phosphate
(D) Uracil + deoxyribose + phosphate
9. Most of the enzymes work at an optimum temperature between _____. [2021]
(A) 60°C and 70°C (B) 20°C and 35°C
(C) 40°C and 50°C (D) 35°C and 45°C
10. The concept which suggest that the active site of an enzyme is flexible and continually reshapes by its interaction with substrate, is known as _____. [2021]
(A) Fluid Mosaic model
(B) Lock and key model
(C) Induced Fit model
(D) Michaelis – Menten constant model
11. Egg albumin is an example of _____. [2021]
(A) Simple proteins
(B) Conjugated proteins
(C) Simple lipids
(D) Compound lipids
12. The peptide chains loop, twist and fold back on themselves due to the formation of _____ bonds to form stable tertiary structure of protein. [2021]
(A) Disulphide (B) Diester
(C) Peptide (D) Phosphate



13. The spiral configuration of α -helix and β -helix of polypeptide chains are held together by _____ bonds to form secondary structure of protein. [2021]
 (A) phosphodiester (B) hydrogen
 (C) peptide (D) disulphide
14. The substance upon which an enzyme acts is termed as _____. [2021]
 (A) prosthetic group (B) exoenzyme
 (C) endoenzyme (D) substrate
15. Diosgenin obtained from yam plant (*Dioscorea*) is used in the manufacturing of _____. [2022]
 (A) Anti-inflammatory cream
 (B) Antidiabetic pills
 (C) Anticoagulants
 (D) Birth control pills
16. Sterols are composed of steroid nucleus and _____. [2022]
 (A) Looped, twisted and folded back peptide chain
 (B) A spiral helix of polypeptide chain
 (C) A double helix of polynucleotide chains
 (D) A long hydrocarbon side chain
17. Match column – I and column – II with reference to enzymes and select the correct option.

	Column I		Column II
a.	Transferase	i.	aldolase
b.	Hydrolase	ii.	alcohol dehydrogenase
c.	Lyase	iii.	sucrase
d.	Oxidoreductase	iv.	glucokinase

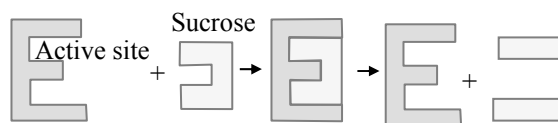
[2022]

- (A) a – ii, b – iii, c – i, d – iv
 (B) a – iv, b – i, c – iii, d – ii
 (C) a – iv, b – iii, c – i, d – ii
 (D) a – iii, b – i, c – ii, d – iv

18. Given below are two statements.
Statement I: Enzyme isomerase catalyzes intramolecular rearrangement of atoms.
Statement II: Oxidation and reduction reactions are catalysed by enzyme transferase.
 In the light of above statements, choose the correct answer from the options given below. [2022]
 (A) Statement I is correct and statement II is incorrect.
 (B) Both statement I and statement II are correct.
 (C) Both statement I and statement II are incorrect.
 (D) Statement I is incorrect and statement II is correct.

19. Which one of the following is the genetic material of bacteriophage ϕ X174? [2022]
 (A) ssRNA (B) ssDNA
 (C) dsRNA (D) dsDNA
20. Which one of the following is an example of cane sugar? [2022]
 (A) Maltose (B) Glucose
 (C) Fructose (D) Sucrose
21. Which one of the following nitrogen base is NOT a component of RNA? [2023]
 (A) Guanine (B) Cytosine
 (C) Thymine (D) Adenine
22. Cerebrosides are _____. [2023]
 (A) cholesterols (B) phospholipids
 (C) glycolipids (D) phytoosterols
23. Identify the INCORRECT statement with reference to enzymes. [2023]
 (A) Lock and key analogy for enzyme action is proposed by Emil Fischer.
 (B) Induced Fit model for enzyme action is proposed by Koshland.
 (C) Increase in substrate concentration decreases the velocity of enzyme activity.
 (D) Protease is a purely proteinaceous enzyme.
24. Erwin Chargaff (1950) estimated that _____. [2023]
 (A) A + T / G + C ratio in a DNA molecule remains constant for a particular species.
 (B) pyrimidines and purines always occur in unequal proportion.
 (C) nitrogen bases are placed regularly along the DNA molecule at a distance of 34°C.
 (D) purine and pyrimidine bases are linked by glycosidic bond.

25. Name the product 'A' and 'B' formed in the given figure of enzyme action. [2023]



	A	B
(A)	glucose	glucose
(B)	glucose	fructose
(C)	fructose	galactose
(D)	glucose	galactose

26. What will be the length of a dsDNA strand, if it contains 100 base pairs? [2023]
 (A) 340 A° (B) 170 A°
 (C) 100 A° (D) 200 A°



27. Match column I with column II

Column I		Column II	
i.	Glucose	a.	reserve food in plants
ii.	Fructose	b.	component of cell wall
iii.	Cellulose	c.	fuel of living cell
iv.	Starch	d.	fruit sugar

[2023]

- (A) i - d, ii - c, iii - b, iv - a
(B) i - c, ii - d, iii - b, iv - a
(C) i - c, ii - a, iii - d, iv - b
(D) i - c, ii - d, iii - a, iv - b

28. Which one of the following cannot be hydrolysed further into smaller molecules?

[2023]

- (A) Starch (B) Sucrose
(C) Fructose (D) Glycogen

29. Match lipids given in Column I with their occurrence in Column II.

Column I		Column II	
i.	Cerebrosides	a.	Most of the cells in animal body
ii.	Waxes	b.	<i>Dioscorea</i>
iii.	Diosgenin	c.	Myelin sheath
iv.	Cholesterol	d.	Sebaceous glands of the skin

[2023]

- (A) i - c, ii - d, iii - a, iv - b
(B) i - b, ii - c, iii - d, iv - a
(C) i - d, ii - c, iii - a, iv - b
(D) i - c, ii - d, iii - b, iv - a

30. In a segment of eukaryotic DNA, if the purine bases are 40, then what will be number of pyrimidine bases?

[2023]

- (A) 20 (B) 40 (C) 60 (D) 80

31. Which element is constituent of all amino acids?

[2023]

- (A) Copper (B) Phosphorus
(C) Nitrogen (D) Magnesium

32. The enzymes which act within the cell in which they are synthesized are called _____.

[2023]

- (A) apoenzymes (B) coenzymes
(C) endoenzymes (D) exoenzymes

33. RNA shows the following characters EXCEPT _____.

[2023]

- (A) it is usually single stranded
(B) it always shows A = T, G ≡ C pairing
(C) it consists of ribose sugar
(D) uracil is one of the pyrimidine base

34. Which one of the following lipid is found in the myelin sheath of neuron?

[2023]

- (A) Lecithin (B) Wax
(C) Glycolipid (D) Cholesterol

35. Match the types of enzymes in column-I with examples in column-II and select the correct option. [2023]

Column I		Column II	
i.	Purely proteinaceous enzyme	a.	Glucokinase
ii.	Conjugated enzyme	b.	Epimerase
iii.	Transferase enzyme	c.	Protease
iv.	Isomerase enzyme	d.	FMN

- (A) i - a, ii - b, iii - c, iv - d
(B) i - b, ii - a, iii - c, iv - d
(C) i - c, ii - d, iii - a, iv - b
(D) i - c, ii - d, iii - b, iv - a

36. Given below are the statements regarding enzymes. [2023]

Choose the correct statements.

- i. All enzymes are proteinaceous.
ii. Enzyme becomes more active at the temperature of 60° to 70° C.
iii. Enzymes have one or two active sites where substrate binds with the enzyme.
iv. Any increase or decrease in specific pH, enzyme activity is always enhanced.
v. Enzymes remain active to catalyze again after completion of first reaction.

- (A) ii and iv only (B) i and v only
(C) i, iii and v only (D) ii, iii and v only

37. Steroids are examples of _____. [2023]

- (A) polysaccharides
(B) derived proteins
(C) conjugated proteins
(D) derived lipids

38. Given below are two statements:

Statement I : Disaccharides are soluble in water hence can easily pass through the cell membrane by diffusion.

Statement II : All disaccharides are reducing sugars.

In the light of above two statements, choose the correct answer from the option given below. [2023]

- (A) Both statement I and statement II are correct.
(B) Both statement I and statement II are incorrect.
(C) Statement I is correct but statement II is incorrect.
(D) Statement I is incorrect but statement II is correct.

39. The sugar present in DNA is _____. [2023]

- (A) ribose (B) ribulose
(C) glucose (D) deoxyribose

40. The size of mRNA is generally related to _____. [2024]

- (A) the number of codons it has
(B) the size of the ribosome



- (C) the size of entire DNA molecule
(D) the number of anticodons it has
41. Secondary metabolites like glucosinolates are produced by cabbage to [2024]
(A) protect it from many pests
(B) attracts insects for pollination
(C) kills weeds around it
(D) improve soil fertilization
42. Which of the following are examples of aldoses sugar? [2024]
(A) Glucose only
(B) Glucose and xylose only
(C) Glucose, xylose and fructose only
(D) Glucose, xylose, fructose and ribulose
43. The cells which usually store fats in animal body are _____. [2024]
(A) adipocytes (B) osteocytes
(C) chondrocytes (D) chondroblasts
44. Starch is usually found in two forms _____ and _____ which are made from α -glucose. [2024]
(A) branched amylose and branched amylopectin
(B) unbranched amylopectin and branched amylose
(C) unbranched amylose and branched amylopectin
(D) unbranched amylopectin and unbranched amylose
45. Match the simple lipid present in different parts of animal body given in column I with their function in column II

	Column I		Column II
i.	Deposited in subcutaneous tissue	a.	Water resistance
ii.	Stored in adipocytes	b.	insulator
iii.	Around internal organs	c.	reserved food
iv.	Coating on skin	d.	Shock absorber

[2024]

- (A) i - b ii - c iii - d iv - a
(B) i - a ii - b iii - d iv - c
(C) i - c ii - a iii - b iv - d
(D) i - d ii - c iii - a iv - b

46. Given below are two statements:
Statement I - Chemically all living organisms have basic three types of macromolecules (P|C|N).
Statement II - Three types of basic macromolecules present in all living organisms are polymers of simple subunits called monomers.
In the light of above statements, select the correct option given below: [2024]

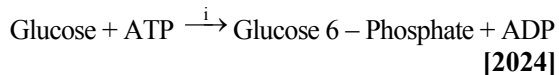
- (A) Both statement I and statement II are correct.
(B) Both statement I and statement II are incorrect.
(C) Statement I is correct but statement II is incorrect.
(D) Statement I is incorrect but statement II is correct.

47. Given below are the two statements.
Statement I - Disaccharides are too big to pass through the cell membrane by diffusion.
Statement II - During digestion, disaccharides are broken down in the small intestine into monosaccharides.
In the light of above statements, choose the correct answer from the options given below: [2024]
(A) Both statement I and statement II are correct.
(B) Both statement I and statement II are incorrect.
(C) Statement I is correct but statement II is incorrect.
(D) Statement I is incorrect but statement II is correct.

48. Select the correct option with the reference to enzyme activity considering following statements. [2024]

- i. Enzymes have flexible structure in which the active site continuously reshapes by its interaction with substrate.
ii. The rate of an enzymatic reaction is directly proportional to the concentration of the substrate and to the square root of the concentration of enzyme.
iii. The enzymatic reaction occurs best at or around 37°C body temperature in homeotherms.
iv. Almost all the enzymes catalyse the reactions at similar pH value.
(A) i and ii only (B) i only
(C) i, ii and iii only (D) iii and iv only

49. Name the enzyme marked as 'i' in the following chemical reaction.



[2024]

- (A) Sucrase (B) Glucokinase
(C) Isomerase (D) Aldolase



Answer Key

Classical Thinking

6.0: 1. (C) 2. (C) 3. (B)**6.1:** 1. (B) 2. (D) 3. (A) 4. (B) 5. (D) 6. (B) 7. (B) 8. (B) 9. (B) 10. (A)
11. (B) 12. (B) 13. (A) 14. (D) 15. (D) 16. (B) 17. (A) 18. (A) 19. (A) 20. (C)
21. (D) 22. (A) 23. (C) 24. (B) 25. (D) 26. (A) 27. (C) 28. (B) 29. (B) 30. (B)
31. (B) 32. (B) 33. (C) 34. (C) 35. (B) 36. (C) 37. (C) 38. (C) 39. (B) 40. (D)
41. (B) 42. (C) 43. (B) 44. (C) 45. (C) 46. (B) 47. (C) 48. (C) 49. (C) 50. (D)
51. (D) 52. (C) 53. (A) 54. (B) 55. (C) 56. (D) 57. (A) 58. (C) 59. (B)**6.2:** 1. (B) 2. (A) 3. (C)

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21. (C) 22. (C) 23. (C) 24. (A) 25. (B) 26. (A) 27. (B) 28. (C) 29. (D) 30. (B)
31. (C) 32. (C) 33. (B) 34. (C) 35. (C) 36. (C) 37. (D) 38. (B) 39. (D) 40. (A)
41. (A) 42. (B) 43. (A) 44. (C) 45. (A) 46. (A) 47. (A) 48. (C) 49. (B)



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