

SAMPLE CONTENT



TRIUMPH

MHT-CET

BIOLOGY

BASED ON STD. XI & XII SYLLABUS OF MHT-CET

6266 MCQs

Chapterwise and
Topicwise MCQs

- ▶ Previous Years' Question (PYQs)MCQs
- ▶ Segregated into 3 levels
- ▶ Model Question Papers
- ▶ Evaluation Tests
- ▶ Quick Review
- ▶ Smart Keys

Includes
Authentic Questions
From Latest
MHT-CET
Examination



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Target Publications® Pvt. Ltd.

Written in accordance with the latest MHT-CET Paper Pattern prescribed by
State Common Entrance Test Cell, Maharashtra State

TRIUMPH MHT-CET BIOLOGY

6266
MCQS

Based on the latest Syllabus of MHT-CET

Salient Features

- Includes chapters of Std. XII and relevant chapters of Std. XI as per the latest MHT-CET Syllabus
- Includes '6266' MCQs
- Quick Review and exhaustive subtopic wise coverage of MCQs
- Solved Previous Years' MHT-CET questions till 2023
- Evaluation Test for each chapter
- Two Model Question Papers with answer keys (Solutions provided through Q.R. codes)
- Two Question Papers & Answer Keys of MHT-CET 2023 (Solutions provided through Q.R. codes)
- Includes **Smart Keys** (Key Notes For Good Practice, Smart Code, Caution, Thinking Hatke)
- Video/pdf links via QR codes for boosting conceptual retention
- Answer keys for all the chapters and Evaluation Tests at the end of book
- Solutions to MCQs and Evaluation Test can be accessed through Q.R. code given at the end of each chapter*

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PREFACE

“Don't follow your dreams; chase them!” A quote by Richard Dumbrill is perhaps the most pertinent for one who is aiming to crack entrance examinations held after Standard XII. We are aware of the aggressive competition a student appearing for such career-defining examinations experiences and hence wanted to create books that develop the necessary knowledge, tools, and skills required to excel in these examinations.

We believe that although the syllabus for Std. XII and XI and MHT-CET is aligned, the outlook for studying the subject should be altered based on the nature of the examination. To score well in the MHT-CET, a student has to be not just good with the concepts but also quick to complete the test successfully. Such ingenuity can be developed through sincere learning and dedicated practice.

As a first step to MCQ solving, students should start with elementary questions. Once momentum is gained, complex MCQs with a higher level of difficulty should be practised. Such holistic preparation is the key to succeeding in the examination!

Target's **Triumph MHT-CET Biology** book has been designed to achieve the above objectives. Beginning with basic MCQs, the book proceeds to develop competence to solve complex MCQs. It offers ample practice of recent questions from MHT-CET examinations. It also includes solutions (via QR codes) that provide explanations to help students learn how to solve the MCQs.

The sections of **Key Notes For Good Practice, Quick Review and MCQs (Classical, Critical, Concept Fusion, Previous Years' MHT-CET Questions, Evaluation Test)** form the backbone of every chapter and ensure adequate revision.

The two **Model Question Papers** given at the end of the book are specially prepared to gauge the student's preparedness to appear for the MHT-CET examination. Two **MHT-CET 2023 Question Papers** have been provided to offer students a glimpse of the complexity of the questions asked in the examination.

All the features of this book pave the way for a student to excel in the examination. The features are designed keeping the following elements in mind: Time management, easy memorization or revision, and non-conventional yet simple methods for MCQ solving. The features of the book presented on the next page will explain more about them!

We hope the book benefits the learner as we have envisioned.

Publisher

Edition: Second

The journey to create a complete book is strewn with triumphs, failures and near misses. If you think we've nearly missed something or want to applaud us for our triumphs, we'd love to hear from you.

Please write to us on: mail@targetpublications.org

Disclaimer

This reference book is transformative work based on Std. XI and XII Biology Textbooks; Reprint: 2022 published by the Maharashtra State Bureau of Textbook Production and Curriculum Research, Pune. We the publishers are making this reference book which constitutes as fair use of textual contents which are transformed by adding and elaborating, with a view to simplify the same to enable the students to understand, memorize and reproduce the same in examinations.

This work is purely inspired upon the course work as prescribed by the Maharashtra State Bureau of Textbook Production and Curriculum Research, Pune. Every care has been taken in the publication of this reference book by the Authors while creating the contents. The Authors and the Publishers shall not be responsible for any loss or damages caused to any person on account of errors or omissions which might have crept in or disagreement of any third party on the point of view expressed in the reference book.

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FEATURES

Key Notes For Good Practice

includes thoughtful/logical key concepts and common misconceptions in the chapter. *This is our attempt to encourage students to use the precise principles and procedures of Biology aimed at overcoming common misconceptions.*

Key Notes
For
Good Practice

Quick
Review

Quick Review includes tables/charts to summarize the key points in the chapter. *This is our attempt to help students to reinforce key concepts.*

Classical Thinking section encompasses straight forward questions including knowledge based questions.

This is our attempt to revise chapter in its basic form and warm up students to deal with complex MCQs.

Classical
Thinking

Critical
Thinking

Critical Thinking section encompasses challenging questions which test understanding, rational thinking and application skills of students. *This is our attempt to take students from beginner to proficient level in smooth steps.*

Concept Fusion section encompasses whose solutions require knowledge of concepts covered in different sub-topics of same chapter or from different chapters.

This is our attempt to develop cognitive thinking in the students essential to solve questions involving fusion of multiple key concepts.

Concept
Fusion

MHT-CET
Previous Years'
Questions

MHT-CET Previous Years' Questions section encompasses questions from MHT-CET examinations. *This is our attempt to give students practice of MHT-CET questions and advance them to acquire knack essential to solve such questions.*

Evaluation Test encompasses questions based on concepts covered in the entire chapter.

This is our attempt to allow self-assessment of the chapter

Evaluation
Test

Continued...

FEATURES

Every section is **segregated sub-topic wise**.

This is our attempt to cater to individualistic pace and preferences of studying a chapter in students and enable easy assimilation of questions based on the specific concept.

Sub-topic wise Segregation

QR Code

QR Code includes

- Video/pdf links for boosting conceptual retention
- Solutions to MCQs and Evaluation Test for each chapter
- Solutions to Model Question Papers I and II
- Solutions to MHT-CET 2023 Question Papers

Caution apprises students about mistakes often made while solving MCQs.

Caution

Smart Code

Smart Code showcases simple and smart mnemonic created for selected concepts.

Thinking Hatke reveals quick witted approach to crack the specific question.

Thinking Hatke

MHT-CET PAPER PATTERN

- There will be three papers of Multiple Choice Questions (MCQs) in 'Mathematics', 'Physics and Chemistry' and 'Biology' of 100 marks each.
- Duration of each paper will be 90 minutes.
- Questions will be based on the syllabus prescribed by Maharashtra State Board of Secondary and Higher Secondary Education with approximately 20% weightage given to Std. XI and 80% weightage will be given to Std. XII curriculum.
- Difficulty level of questions will be at par with JEE (Main) for Mathematics, Physics, Chemistry and at par with NEET for Biology.
- There will be no negative marking.
- Questions will be mainly application based.
- Details of the papers are as given below:

Paper	Subject	Approximate No. of Multiple Choice Questions (MCQs) based on		Mark(s) Per Question	Total Marks
		Std. XI	Std. XII		
Paper I	Mathematics	10	40	2	100
Paper II	Physics	10	40	1	100
	Chemistry	10	40		
Paper III	Biology	20	80	1	100

- Questions will be set on
 - the entire syllabus of Std. XII of Physics, Chemistry, Mathematics and Biology subjects prescribed by Maharashtra Bureau of Textbook Production and curriculum Research, Pune, and
 - chapters / units from Std. XI curriculum as mentioned below:

Sr. No.	Subject	Chapters / Units of Std. XI
1	Physics	Motion in a plane, Laws of motion, Gravitation, Thermal properties of matter, Sound, Optics, Electrostatics, Semiconductors
2	Chemistry	Some Basic Concepts of Chemistry, Structure of Atom, Chemical Bonding, Redox Reactions, Elements of Group 1 and Group 2, States of Matter: Gaseous and Liquid States, Basic Principles of Organic Chemistry, Adsorption and Colloids, Hydrocarbons
3	Mathematics	Trigonometry - II, Straight Line, Circle, Measures of Dispersion, Probability, Complex Numbers, Permutations and Combinations, Functions, Limits, Continuity
4	Biology	Biomolecules, Respiration and Energy Transfer, Human Nutrition, Excretion and osmoregulation

CONTENTS

Sr. No.	Textbook Chapter No.	Chapter Name	Page No.
Std. XI			
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5	1	Reproduction in Lower and Higher Plants	88
6	2	Reproduction in Lower and Higher Animals	117
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Practice test Papers are the only way to assess your preparedness for the Exams. Scan the adjacent QR code to know more about our **"MHT-CET Biology Test Series with Answer Key & Solutions"** book for the MHT-CET Entrance examination.





DNA: The Potential Future of Digital Data Storage

Biomolecule DNA, which carries genetic information, can store an incredible amount of data? In fact, just one gram of DNA can theoretically hold all the digital data in the world! This is because DNA is made up of four different nucleotides, each of which can represent two bits of information. Scientists have already successfully encoded books, images, and even an entire operating system onto DNA. As technology advances, it's possible that DNA could become a more efficient and long-lasting way to store data than current digital storage methods.

Chapter Outline

- | | | | |
|-----|--------------------------|-----|-----------------------|
| 6.0 | Introduction | 6.2 | Concept of Metabolism |
| 6.1 | Biomolecules in the Cell | | |

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.

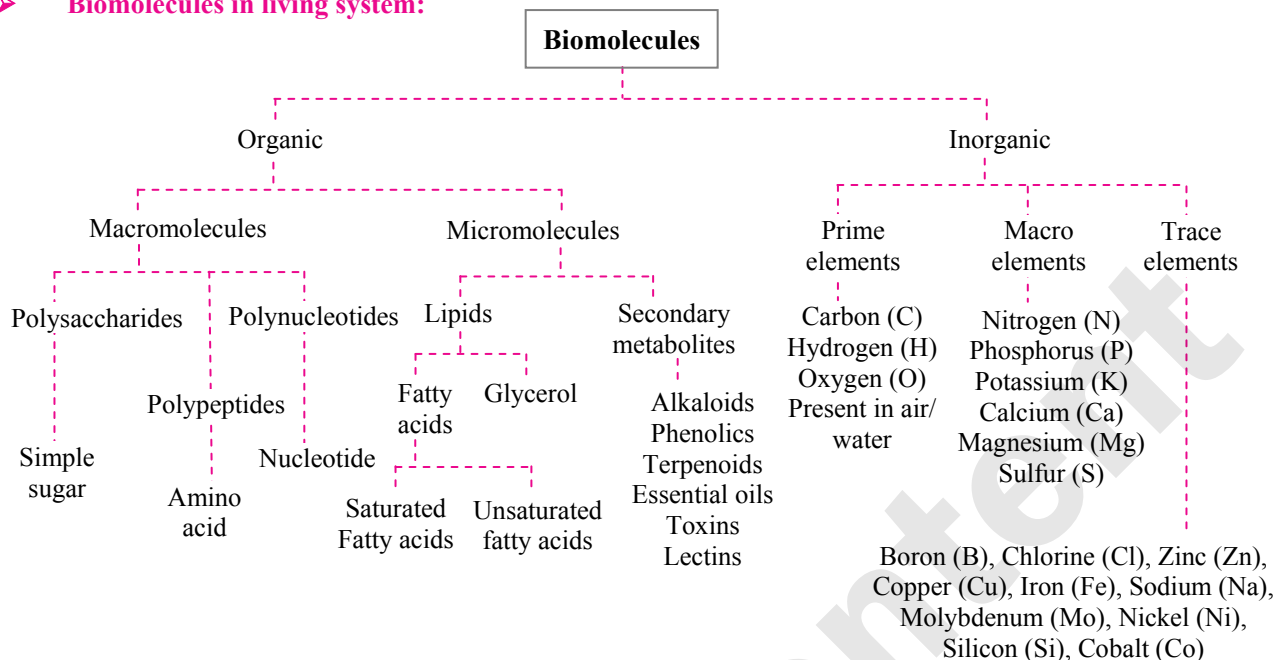
Key Notes For Good Practice

- 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 sulfate	

➤ **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

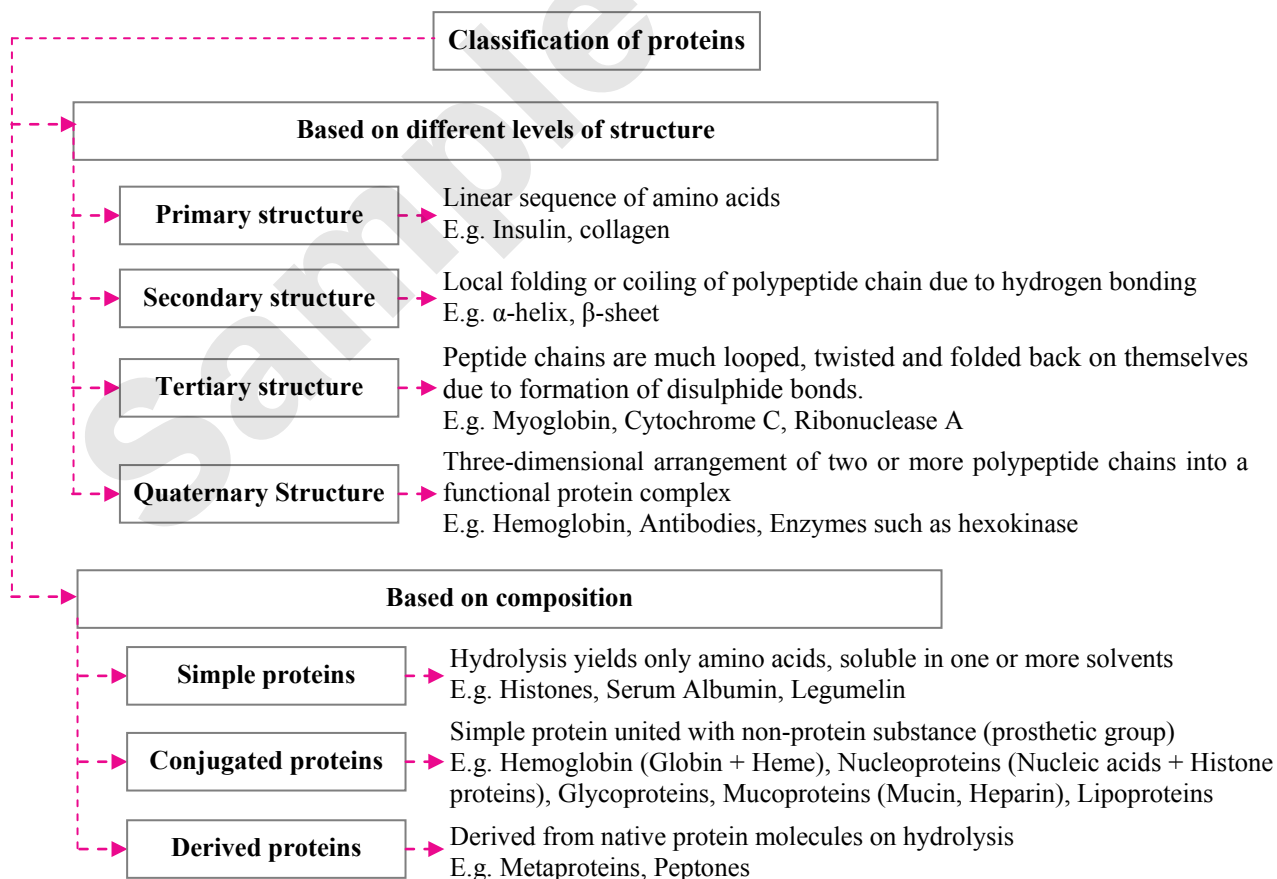


Unsaturated fatty acids (typically liquid at room temperature)	Organic acids composed of hydrocarbon chain with one double bond between carbon atoms	Oleic acid
	Organic acids composed of hydrocarbon chain with two or more double bond between carbon atoms	Linoleic acid

➤ **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

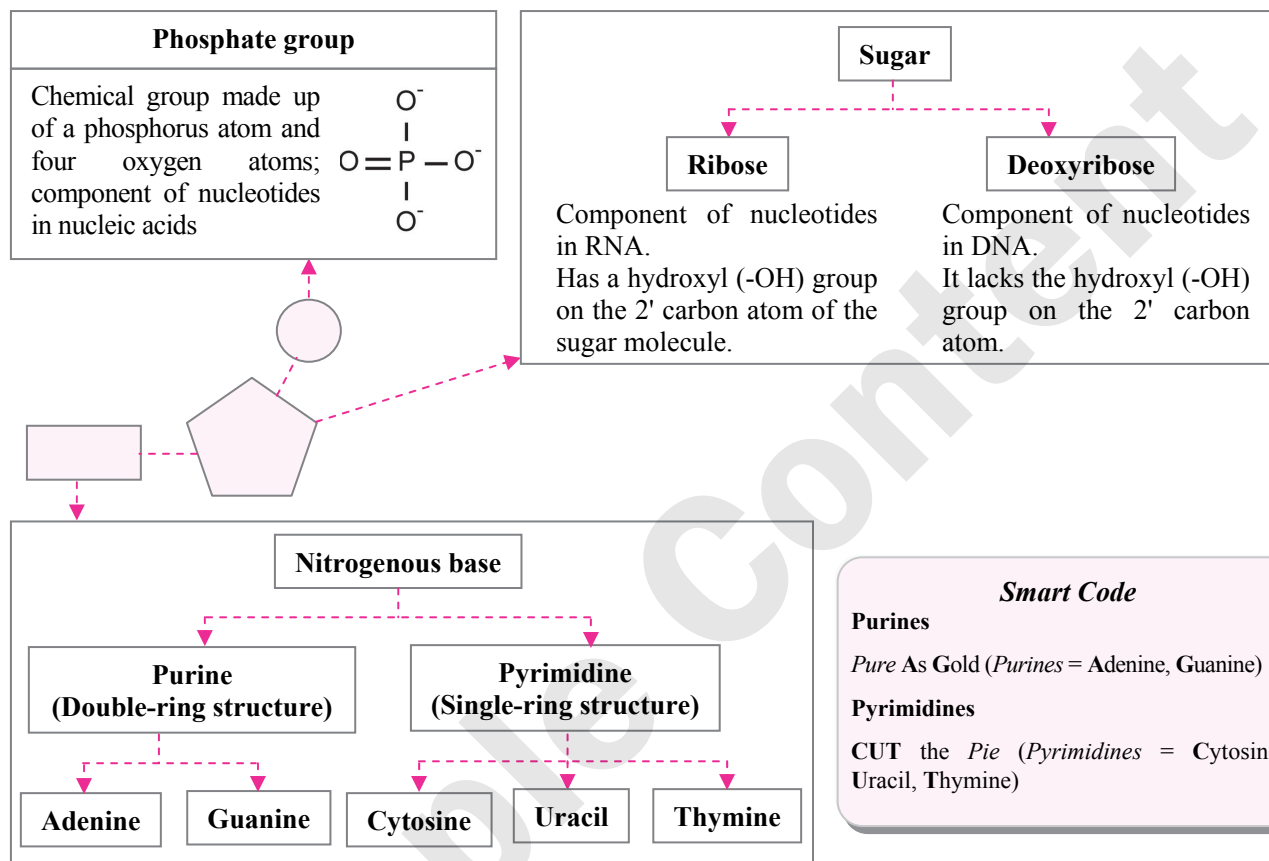
Insulin: Hormone secreted by the pancreas that helps to regulate blood sugar levels.

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:**



Smart Code

Purines
Pure As Gold (Purines = Adenine, Guanine)

Pyrimidines
CUT the Pie (Pyrimidines = Cytosine, Uracil, Thymine)

Smart code

Only if you go to the (*nucleo*) side of the ocean along with Mr. *Phosphate*, then you can view the beautiful (*nucelo*) tides.
Nucleoside + Phosphate = Nucleotide

➤ **DNA (Deoxyribonucleic acid):**

Features	Description
Sugar	Always deoxyribose
Phosphate	Alternates with sugar to form the backbone of DNA
Nitrogenous base	Attached to each sugar, can be adenine, thymine, guanine or cytosine
3' end	End of polynucleotide chain with sugar molecule not connected to another nucleotide with C-3 carbon not connected to phosphate group
5' end	End of polynucleotide chain with sugar molecule with C-5 carbon not connected to any more phosphate group
Shape	Double helix consisting of two complementary polynucleotide chains
Complementary base pairing	A = T ; G ≡ C



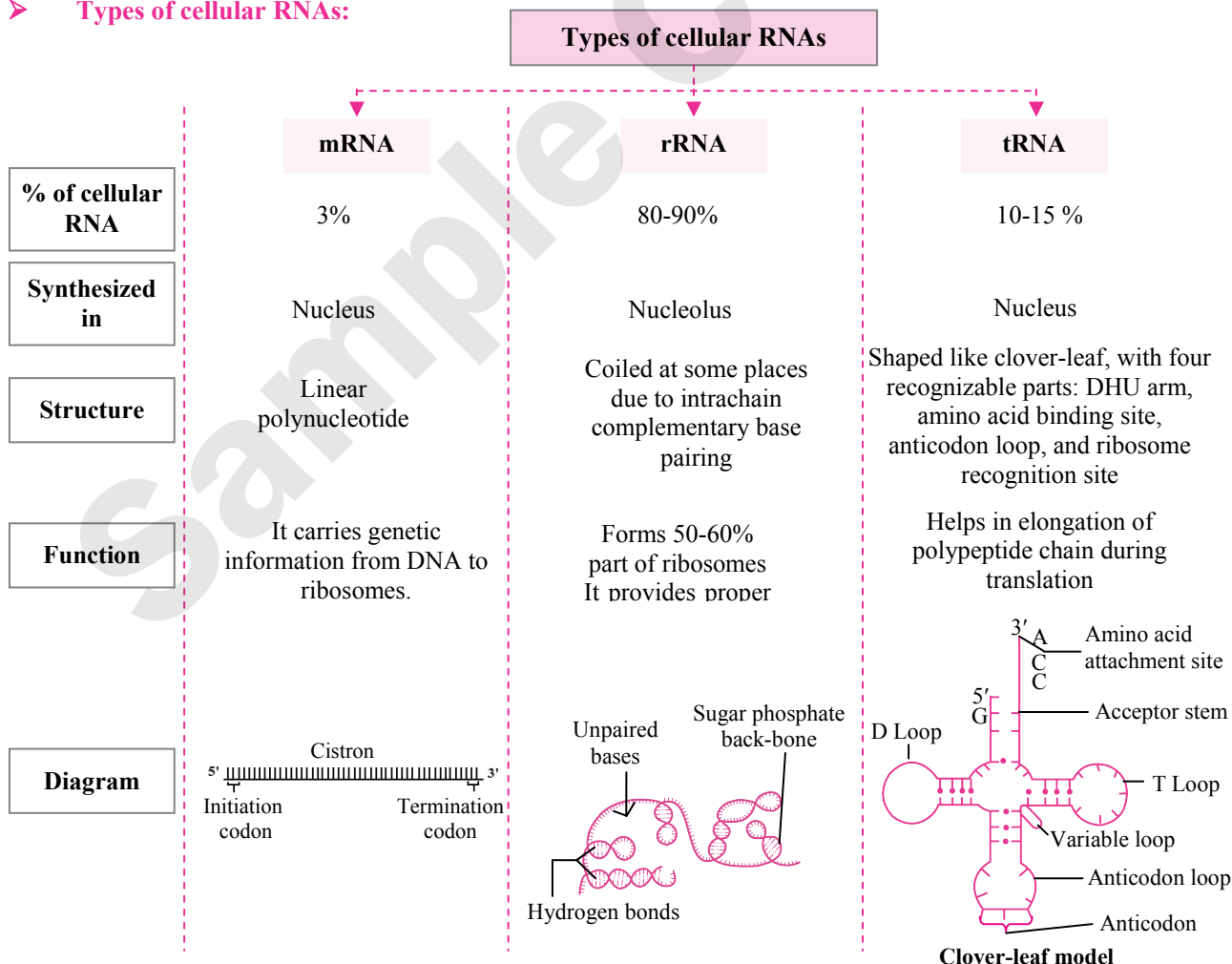
Diameter	20 Å
No. of base pairs/turn	About 10
Length of one turn	34 Å
Distance between nucleotides	3.4 Å

Caution
Bacteriophage ϕ x 174 and several bacterial viruses have ssDNA

➤ **Ribonucleic Acid (RNA):**

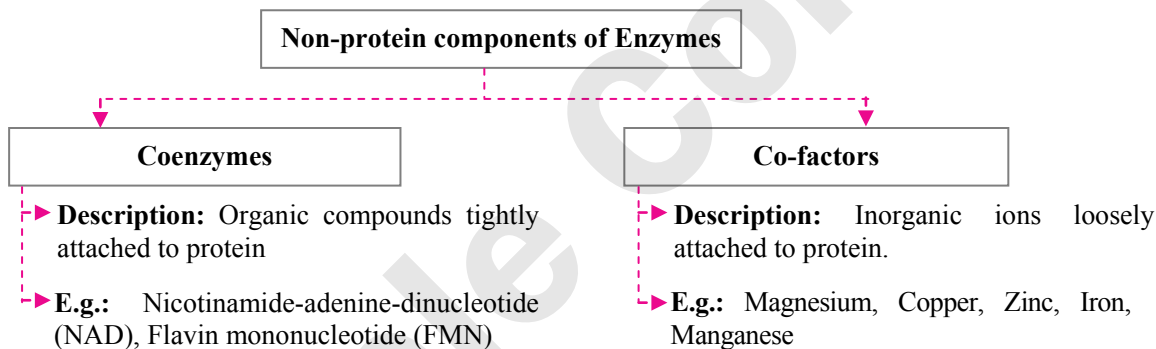
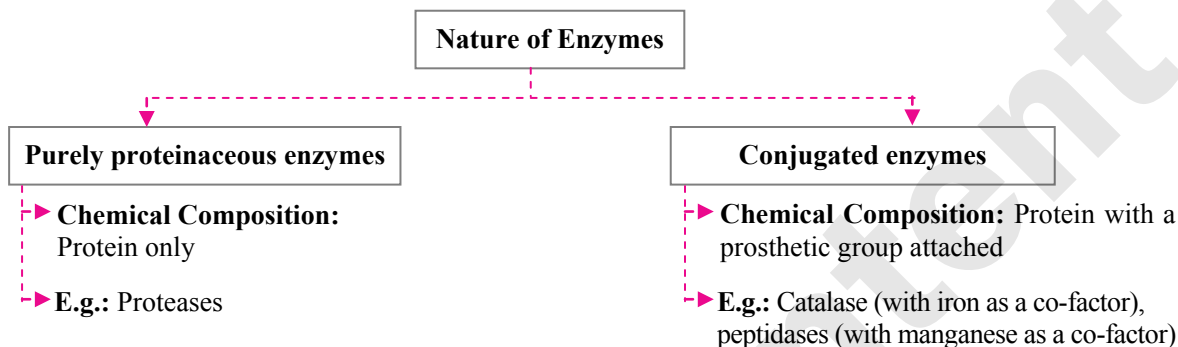
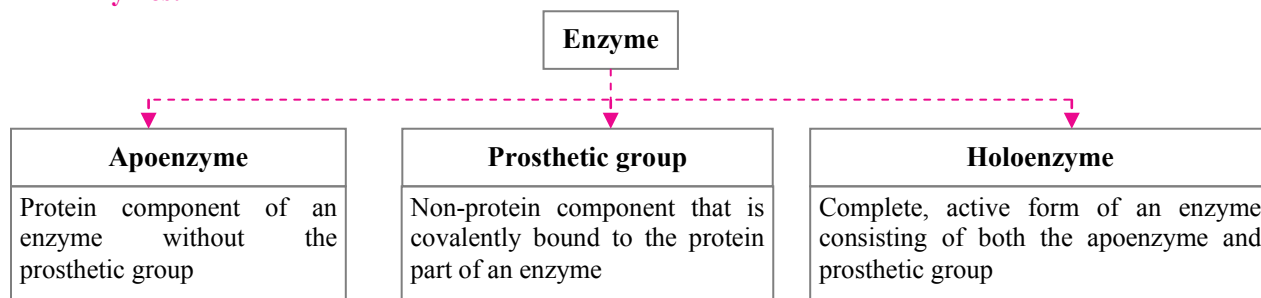
Features	Description
Structure	Single-stranded polynucleotide chain (can be double-stranded in some viruses)
Sugar	Ribose sugar
Base pairs	Uracil substitutes thymine; purine-pyrimidine equality not found due to single-stranded structure
Folding	RNA strand can fold upon itself in certain regions or entirely,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

➤ **Types of cellular RNAs:**

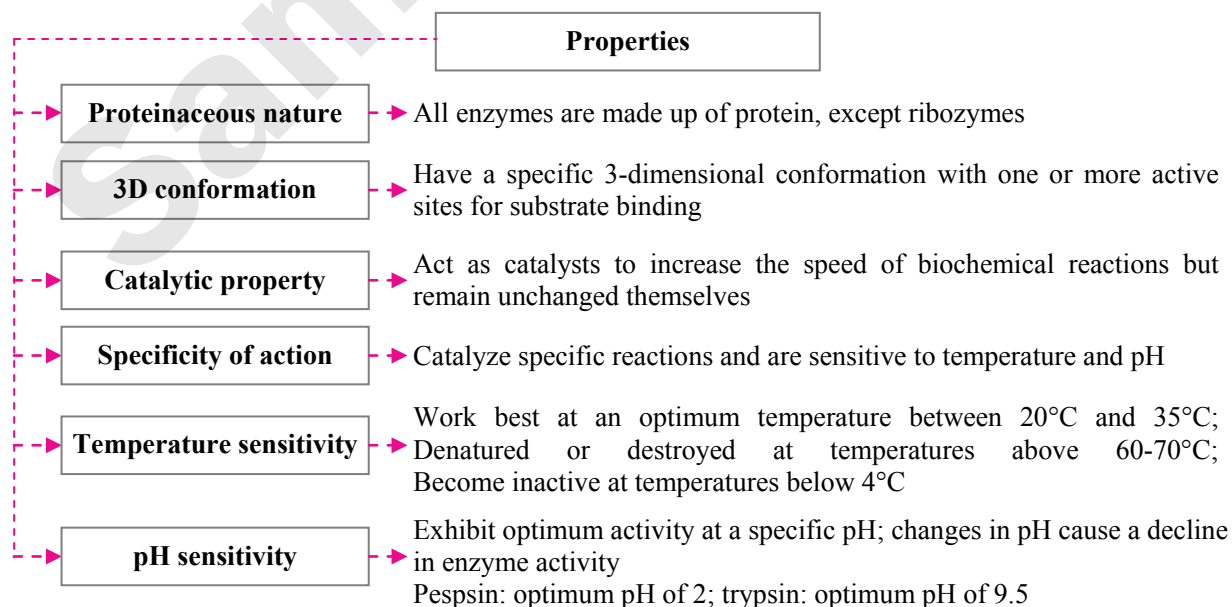




➤ **Enzymes:**



➤ **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.

Caution

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



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

➤ **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 + Pi

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:**

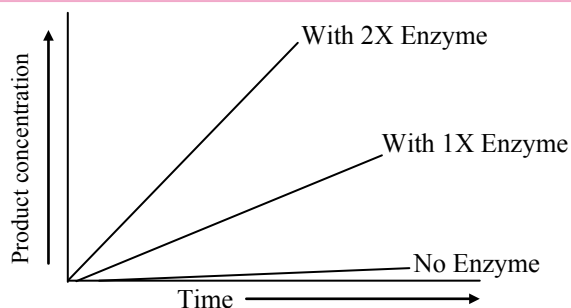
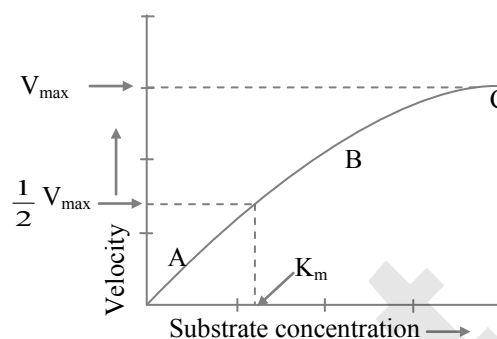
	Lock and Key model	Induced Fit model
Proposed by	Emil Fischer, 1894	Koshland, 1959
Description	Enzyme is lock, substrate is key	Substrate induces conformational change in enzyme
Key Concept	Only correctly sized substrate fits into active site	Active site continually reshapes by interactions with substrate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

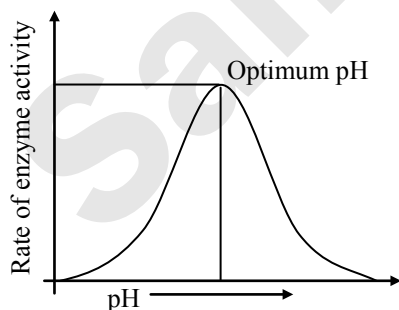
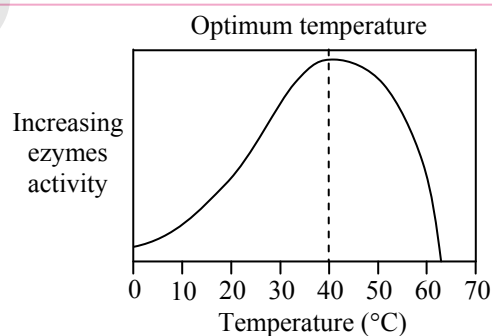


Enzyme concentration

- 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

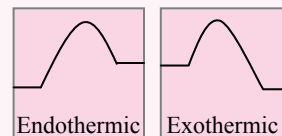
Other substances

- 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

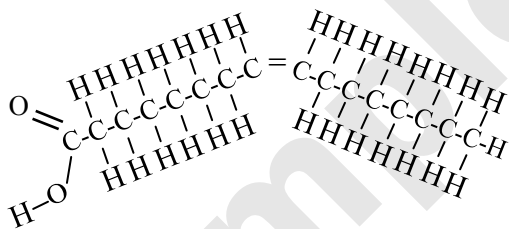
18. Fats are esters of fatty acids with _____.

- (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) cerebrosides
(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*

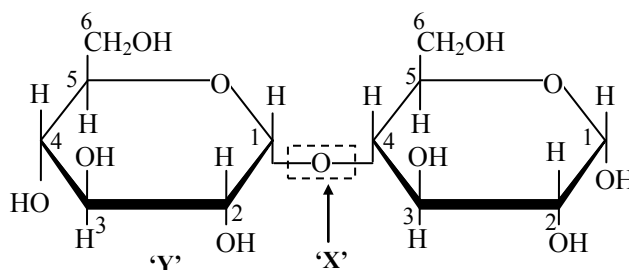
Critical Thinking

6.1 Biomolecules in the Cell

Carbohydrates

1. Monosaccharides have the general molecular formula _____, where n can be 3, 4, 5, 6 and 7.
- $(C_6H_{12}O_6)_n$
 - $(CH_2O)_n$
 - $(CH_2O_6)_n$
 - $(C_6H_{12}O_5)_n$
2. Monosaccharides containing the _____ group are classified as aldoses and those with _____ group are classified as ketoses.
- aldehyde ($-CHO$), a ketone ($=C=O$)
 - ketone ($-CHO$), a aldehyde ($-C=O$)
 - aldehyde ($-CHO$), a ketone ($-C=O$)
 - aldehyde ($-CH=O$), a ketone ($H-C=OH$)
3. The sugar having the molecular formula $C_6H_{12}O_6$ is
- glucose
 - fructose
 - galactose
 - all of these
4. Identify the INCORRECT statement with respect to galactose.
- Galactose cannot play the same role in respiration as glucose.
 - Galactose looks very similar to glucose molecules.
 - Galactose can also exist in α and β forms.
 - Glucose and galactose can be easily converted into one another.
5. Fructose is the fruit sugar and chemically it is ketohexose but it has a _____ rather than a _____.
- five-atom ring, six-atom ring
 - five-atom ring, four-atom ring
 - six-atom ring, five-atom ring
 - four-atom ring, six-atom ring

6. Which of the following is TRUE with respect to reducing sugars?
- A sugar that serves as a reducing agent due to presence of free aldehyde or ketone group is called a reducing sugar.
 - These sugars reduce the Benedict's reagent (Cu^{2+} to Cu^+) since they are capable of transferring hydrogens (electrons) to other compounds.
 - Reducing sugars include monosaccharides.
- i and iii
 - Only i
 - ii and iii
 - i, ii and iii
7. Identify the INCORRECT pair from the following.
- Sucrose (cane sugar): On hydrolysis, it produces Glucose and Fructose
 - Lactose (milk sugar): On hydrolysis, it produces Glucose and Galactose
 - Maltose (malt sugar): On hydrolysis, it produces two units of Glucose
 - Fructose (Fruit sugar): On hydrolysis, it produces Glucose and Lactose
8. Identify the X and Y in the following structure of a disaccharide.



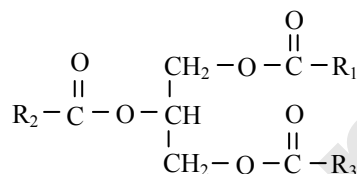
- X: Peptide bond Y: Glucose
- X: Glycosidic bond Y: Lactose
- X: Glycosidic bond Y: Glucose
- X: Glycosidic bond Y: Erythrose



9. Corn is immersed in boiling water. After cooling, the solution becomes sweet. This is because
 (A) enzymes are inactivated in boiling water.
 (B) disaccharides are converted to monosaccharides.
 (C) monosaccharides are converted to disaccharides.
 (D) none of these
10. Study the following statements and select the correct option.
 (i) Amylose is an unbranched polymer of α -glucose.
 (ii) Amylopectin is a branched polymer of α -glucose.
 (A) Statement (i) is correct.
 (B) Statement (ii) is incorrect.
 (C) Both the statements are correct.
 (D) Both the statements are incorrect.
11. Which of the following statements is CORRECT with respect to cellulose?
 (A) It is a polymer made from β -glucose molecules.
 (B) It is a polymer made from α -glucose molecules.
 (C) It is a disaccharide made from β -glucose molecules.
 (D) It is a monomer made from β -glucose molecule.

Lipids

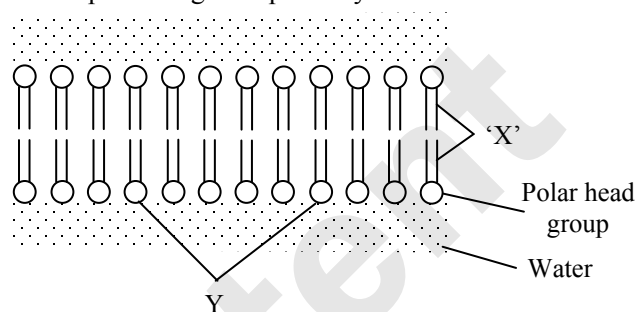
12. Identify the following biomolecule:



- (A) Triglyceride (B) Glycerol
 (C) Phospholipid (D) Cholesterol
13. Which of the following organic compounds is the main constituent of Lecithin?
 (A) Phosphoprotein
 (B) Arachidonic acid
 (C) Phospholipid
 (D) Cholesterol
14. Read the following statements with respect to compound lipids and select the correct option.
 (i) Compound lipids are esters of fatty acids containing other groups like phosphate (Phospholipids), sugar (glycolipids), etc.
 (ii) Glycolipids contain glycerol, fatty acids, simple sugars such as galactose. They are also called cerebrosides.
 (A) Statement (i) is correct.
 (B) Statement (ii) is correct.
 (C) Statements (i) and (ii) are incorrect.
 (D) Statements (i) and (ii) are correct.

15. Which of the following are synthesized from cholesterol?
 i. Adrenocorticoids
 ii. Sex hormones (progesterone, testosterone)
 iii. Vitamin D
 (A) Only i (B) ii and iii
 (C) i and iii (D) i, ii and iii

16. Identify 'X' and 'Y' in the following diagram representing the lipid bilayer.



- (A) X: Non-polar tail
 Y: Glycerol
 (B) X: Polar tail
 Y: Phospholipid molecules
 (C) X: Non-polar tail
 Y: Phospholipid molecules
 (D) X: Non-polar tail
 Y: Palmitic acid molecules

17. Which of the following is a derived lipid with four interlocking rings?
 (A) Cholesterol (B) Estrogen
 (C) Testosterone (D) All of these
18. Match the items in Column I with items in Column II and choose the correct answer.

	Column I		Column II
i.	Triglyceride	a.	Animal hormones
ii.	Membrane lipid	b.	Feathers and leaves
iii.	Steroid	c.	Phospholipids
iv.	Wax	d.	3 FA + 1 Glycerol

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

Proteins

19. Study the following statements and select the correct option.
 i. In quaternary structure, the peptide chains are much looped, twisted and folded back on themselves due to formation of hydrogen bonds.
 ii. When a protein has more than two polypeptide subunits their arrangement in space is called secondary structure.
 (A) Statement (i) is correct.
 (B) Statement (ii) is correct.
 (C) Both the statements (i) and (ii) are correct.
 (D) Both the statements (i) and (ii) are incorrect.

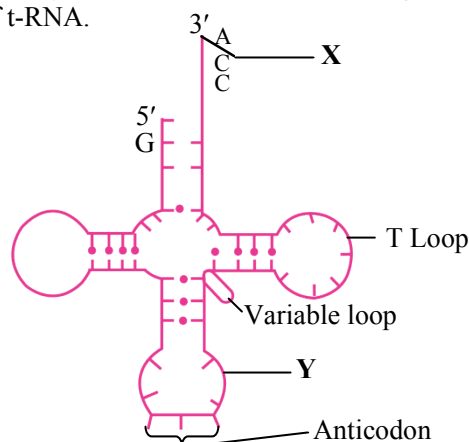


20. Which of the following correctly describes the amphoteric nature of proteins?
 (A) Proteins can act as only acids.
 (B) Proteins can act as only bases.
 (C) Proteins can act as both acids and bases.
 (D) Proteins only show presence of non-polar amino acids.
21. A tripeptide contains
 (A) 3 amino acids (B) 4 amino acids
 (C) 6 amino acids (D) 2 amino acids
22. Read the following statements with respect to albumin and histones and select the correct option.
- Histones are insoluble in water but they get coagulated on heating.
 - Albumins are insoluble in water.
- (A) Statement (i) is correct.
 (B) Statement (ii) is correct.
 (C) Both the statements (i) and (ii) are correct.
 (D) Both the statements (i) and (ii) are incorrect.
23. Which of the following is the least likely to be involved in stabilizing the three-dimensional folding of most proteins?
 (A) Ester bonds
 (B) Hydrogen bonds
 (C) Electrostatic interaction
 (D) Hydrophobic interaction
24. Identify 'X' and 'Y' in the following table.
- | Proteins | Role |
|----------------|----------------|
| Immunoglobulin | X |
| Y | Blood clotting |
- (A) X: Transport of Oxygen
 Y: Haemoglobin
 (B) X: Resistance against diseases
 Y: Fibrinogen
 (C) X: Muscle contraction
 Y: Fibrinogen
 (D) X: Structural stability of cell
 Y: Fibrinogen

Nucleic Acids

25. DNA consists of two complementary nucleotide chains. If the sequence of nucleotide in one of the chains is 5'AGCTTCGA3', then the nucleotide sequence in the other chain shall be
 (A) 5'TAGCATAT3' (B) 5'GATCCTAG3'
 (C) 3'TCGAAGCT5' (D) 3'GCTAAGCT5'
26. In a 3.2 Kbp long piece of DNA, 820 adenine bases were found. What would be the number of cytosine bases?
 (A) 780 (B) 1560
 (C) 740 (D) 1480

27. Chargaff's rules are applied to
 (A) ssRNA (B) ssDNA
 (C) dsDNA (D) mRNA
28. In an experiment, DNA was found to have 31% adenine and 19% guanine. The percentage of cytosine shall be
 (A) 38% (B) 31%
 (C) 19% (D) 62%
29. A DNA molecule measuring 680 Å contains _____ nucleotides.
 (A) 1360 (B) 510
 (C) 340 (D) 400
30. DNA differs from RNA in _____.
 (A) absence of – OH group at the 2'- position
 (B) presence of – OH group at the 2'- position
 (C) absence of phosphate group at the 2'- position
 (D) presence of phosphate group at 2'- position.
31. Read the following statements and select the correct option.
- m-RNA carries genetic information from DNA to ribosomes, which are the sites of protein synthesis.
 - r-RNA provides proper binding site for m-RNA during protein synthesis.
 - t-RNA helps in elongation of polypeptide chain during the process called translation.
- (A) Statements i and ii are correct.
 (B) Statements ii and iii are correct.
 (C) Statements i and iii are correct.
 (D) Statements i, ii and iii are correct.
32. Identify 'X' and 'Y' in the following structure of t-RNA.

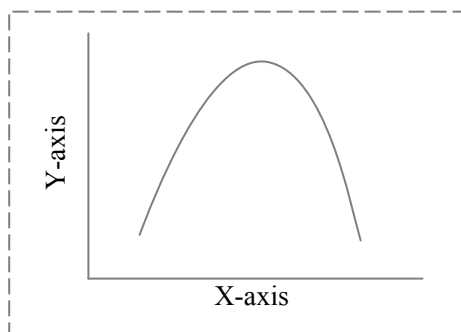


- (A) X: Amino acid acceptor end
 Y: Codon loop
 (B) X: Nucleotide acceptor end
 Y: Anti-codon loop
 (C) X: Amino acid acceptor end
 Y: Anti-codon loop
 (D) X: Amino acid acceptor end
 Y: DHU loop



Enzymes

33. Read the following statements with respect to enzymes and select the correct option.
- Each enzyme exhibits its highest activity at a specific pH i.e. optimum pH.
 - Enzymes are denatured at lower temperature of 10-20°C.
 - Most of the enzymes work at an optimum temperature between 20°C and 35°C.
- (A) Statement i and ii are correct.
 (B) Statement ii and iii are correct.
 (C) Statement i and iii are correct.
 (D) Statement i, ii and iii are incorrect.
34. The curve given below shows enzymatic activity with relation to change in conditions. What do the two axes (X and Y) represent?

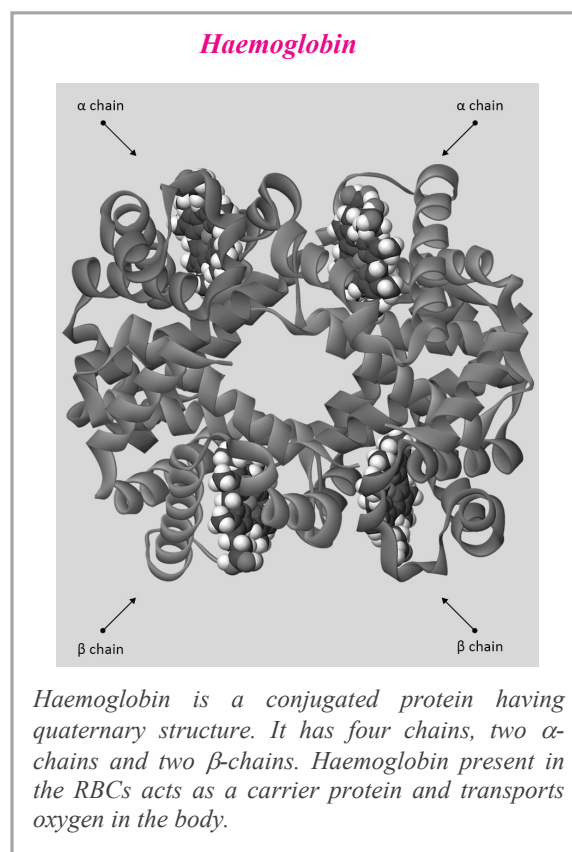


	X-axis	Y-axis
(A)	Temperature	Enzymatic activity
(B)	Substrate concentration	Enzymatic activity
(C)	Enzymatic activity	Temperature
(D)	Enzymatic activity	pH

35. Which of the following statement is CORRECT about enzyme substrate complex?
- (A) It induces the enzyme to alter its shape.
 (B) It fits the enzyme more tightly around substrate.
 (C) It breaks the chemical bonds of substrate.
 (D) All of these
36. Arrange the sequences in enzyme action.
- Product releases and free enzyme again binds to another substrate molecule.
 - Enzyme to alter its shape
 - Substrate binds to active site of the enzyme
 - Fits in to the active site
 - Formation of enzyme product complex.
- The correct answer is:
- (A) i, iii, iv, ii, v
 (B) i, ii, iv, iii, v
 (C) iii, ii, iv, v, i
 (D) iii, iv, ii, v, i

6.2 Concept of Metabolism

1. Which of the following is TRUE with respect to catabolic and anabolic reactions?
- (A) Catabolic reaction: Conversion of maltose to glucose.
 Anabolic reaction: Synthesis of starch from glucose
- (B) Catabolic reaction: Conversion of starch to glucose.
 Anabolic reaction: Synthesis of glycogen from glucose
- (C) Catabolic reaction: Conversion of glucose to starch.
 Anabolic reaction: Synthesis of glycogen from glucose
- (D) Catabolic reaction: Conversion of starch to glucose.
 Anabolic reaction: Synthesis of glycogen from fructose
2. Study the following type of secondary metabolite and select the correct option.
- Terpenes:** Made from mevalonic acid that is composed mainly of carbon and hydrogen
 - Phenolics:** Made from simple sugars containing benzene rings, hydrogen and oxygen.
- (A) i is correct.
 (B) ii is correct.
 (C) Both i and ii are correct.
 (D) Both i and ii are incorrect.





Concept Fusion

- Identify the substances having glycosidic bond and peptide bond, respectively in their structure:
(A) Glycerol, trypsin
(B) Cellulose, lecithin
(C) Inulin, insulin
(D) Chitin, cholesterol
- Which of the following is a difference between carbohydrates and nucleic acids?
(A) Carbohydrates are made up of monomers called nucleotides, while nucleic acids are made up of monomers called monosaccharides.
(B) Carbohydrates contain carbon, hydrogen, and oxygen, while nucleic acids contain carbon, hydrogen, oxygen, nitrogen, and phosphorus.
(C) Carbohydrates are used as energy storage molecules, while nucleic acids are used as structural components of cells.
(D) Carbohydrates have a double helix structure, while nucleic acids have a linear structure.
- Which of the following macronutrients is the primary source of energy for the human body?
(A) Carbohydrates (B) Lipids
(C) Proteins (D) Vitamins
- Which of the following is a characteristic of enzymes but not proteins?
(A) They are made up of amino acids.
(B) They can be denatured by high temperatures or extreme pH.
(C) They catalyze biochemical reactions.
(D) They have a specific three-dimensional structure.
- Which of the following molecules contains both carbohydrate and protein components?
(A) Cellulose (B) Starch
(C) Glycoprotein (D) Glucose
- Identify the INCORRECT statement.
(A) Insulin is a protein.
(B) All enzymes are proteins.
(C) All proteins are enzymes.
(D) Elastin is a protein.
- Match the following and select the correct option.

	Column I		Column II
i.	Lipid	p.	Glutamic acid
ii.	Amino acid	q.	Glycerol
iii.	Protein	r.	Starch
iv.	Carbohydrate	s.	Collagen

- i – q, ii – s, iii – r, iv – p
- i – q, ii – p, iii – s, iv – r
- i – p, ii – q, iii – r, iv – s
- i – r, ii – s, iii – p, iv – q

MHT-CET Previous Years' Questions

- 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
- Enzymes can react with acidic or basic substances due to their _____ nature. [2019]
(A) Amorphous (B) Competitive
(C) Colloidal (D) Amphoteric
- 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
- 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
- Disaccharides are formed from two monosaccharides by the process of _____. [2020]
(A) Polymerization (B) Hybridization
(C) Hydrogenation (D) Condensation
- 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.
- 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 is a carbohydrate but does NOT follow the general formula of carbohydrate? [2020]
 (A) Lactose (B) Fructose
 (C) Glucose (D) Rhamnose
9. 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
10. 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
11. 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
12. Egg albumin is an example of _____. [2021]
 (A) Simple proteins
 (B) Conjugated proteins
 (C) Simple lipids
 (D) Compound lipids
13. 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
14. 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
15. The substance upon which an enzyme acts is termed as _____. [2021]
 (A) prosthetic group (B) exoenzyme
 (C) endoenzyme (D) substrate
16. 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
17. 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
18. 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. | sucrose |
| 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
19. 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.
20. Which one of the following is the genetic material of bacteriophage ϕ X174? [2022]
 (A) ssRNA (B) ssDNA
 (C) dsRNA (D) dsDNA
21. What is the effect of increase in substrate concentration on the enzymatic activity? [2022]
 (A) It decreases the rate of reaction.
 (B) It has no effect on the rate of reaction.
 (C) It increases the rate of reaction within a limited range only.
 (D) It continuously increases the rate of reaction, irrespective of enzyme quantity.
22. Which one of the following is an example of cane sugar? [2022]
 (A) Maltose (B) Glucose
 (C) Fructose (D) Sucrose

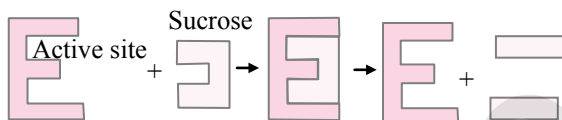


23. Cerebrosides are _____. [2023]
 (A) cholesterols (B) phospholipids
 (C) glycolipids (D) phytosterols

24. 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.

25. 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.

26. 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

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

28. 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

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

[2023]

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

30. 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

31. 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

32. Which element is constituent of all amino acids? [2023]

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

33. The enzymes which act within the cell in which they are synthesized are called _____. [2023]

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

34. 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

35. Which one of the following lipid is found in the myelin sheath of neuron? [2023]

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

36. 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



37. Given below are the statements regarding enzymes. [2023]
Choose the correct statements.
- All enzymes are proteinaceous.
 - Enzyme becomes more active at the temperature of 60° to 70° C.
 - Enzymes have one or two active sites where substrate binds with the enzyme.
 - Any increase or decrease in specific pH, enzyme activity is always enhanced.
 - 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
38. Steroids are examples of _____. [2023]
- (A) polysaccharides
(B) derived proteins
(C) conjugated proteins
(D) derived lipids

39. 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.
40. The sugar present in DNA is _____. [2023]
- (A) ribose (B) ribulose
(C) glucose (D) deoxyribose

Evaluation Test

1. The number of adenine molecules in a given DNA segment is 25 and the number of cytosine molecules is 45. The total number of nucleotides in the segment is
- (A) 70 (B) 140
(C) 90 (D) 50
2. Histone proteins are
- (A) simple proteins
(B) lipoproteins
(C) glycoproteins
(D) chromoproteins
3. As compared to pentose sugar in DNA, the pentose sugar in RNA has
- (A) one carbon atom less
(B) one nitrogen base more
(C) different position of oxygen atom in the ring
(D) one oxygen atom more
4. In eukaryotic cell, DNA is found in
- (A) only nucleus
(B) only mitochondria
(C) only chloroplasts
(D) nucleus, mitochondria and chloroplasts
5. Which of the following has a hairpin structure?
- (A) t-RNA (B) r-RNA
(C) m-RNA (D) all of these

6. Match the following with their functions.

Column I		Column II	
i.	m-RNA	a.	Carries activated amino acids for elongation of polypeptide chain.
ii.	r-RNA	b.	Carries genetic information from nucleus to the site of protein synthesis.
iii.	t-RNA	c.	Associated with ribosome.

- (A) i – b, ii – a, iii – c
(B) i – a, ii – b, iii – c
(C) i – b, ii – c, iii – a
(D) i – c, ii – a, iii – b
7. Enzymes often have additional parts in their structure that are made up of molecules other than proteins. When this additional chemical part is an organic molecule, it is called
- (A) inhibitor (B) coenzyme
(C) metal ion (D) substrates
8. _____ catalyze interconversions of geometric, optical and positional isomers.
- (A) Transferases (B) Ligases
(C) Oxidoreductase (D) Isomerases
9. Identify the INCORRECT statement.
- (A) Insulin is a protein.
(B) All enzymes are proteins.
(C) All proteins are enzymes.
(D) Elastin is a protein.



10. Find the false statement about unsaturated fats.
 (A) They have one or more $C = C$.
 (B) They are produced mostly by plants.
 (C) They are liquid at room temperature.
 (D) They have maximum possible H atoms.
11. Plant waxes contain
 (A) saturated fatty acids
 (B) glycerol
 (C) unsaturated fatty acids
 (D) aldehydes
12. Corn is immersed in boiling water. After cooling, the solution becomes sweet. This is because
 (A) enzymes are inactivated in boiling water.
 (B) disaccharides are converted to monosaccharides.
 (C) monosaccharides are converted to disaccharides.
 (D) none of these
13. Chemically, RNA differs from DNA in having
 (A) uracil in place of thymine
 (B) single strand
 (C) ribose sugar instead of deoxyribose sugar
 (D) all of these
14. Component of coenzyme is
 (A) always protein
 (B) often metal
 (C) always inorganic compound
 (D) often a vitamin
15. Match the following with their percentage composition of the total cell RNA.

	Column I		Column II
i.	m-RNA	a.	80%
ii.	r-RNA	b.	10-15%
iii.	t-RNA	c.	3%

- (A) i - b, ii - a, iii - c
 (B) i - a, ii - b, iii - c
 (C) i - b, ii - c, iii - a
 (D) i - c, ii - a, iii - b
16. Which of the following statement is NOT correct?
 (A) Active site breaks the chemical bonds of substrate and new Enzyme product complex (EP) bind to another molecule of substrate.
 (B) Enzyme product complex (EP) bind to another molecule of substrate.
 (C) Substrate plays a role in determining the final shape of the enzyme.
 (D) The enzyme is partially flexible.
17. Which ratio is constant for DNA?
 (A) $\frac{A+G}{T+C}$ (B) $\frac{A+T}{G+C}$

(C) $\frac{A+C}{U+G}$ (D) $\frac{A+U}{C+G}$

18. Sucrose, a common table sugar, is composed of
 (A) glucose + fructose
 (B) glucose + galactose
 (C) fructose + galactose
 (D) none of these
19. Glycoproteins contain
 (A) protein and fat
 (B) protein and salt
 (C) protein and vitamin
 (D) protein and carbohydrates
20. Select the type of enzyme involved in the following reaction:
 $A - B + A' \longrightarrow A + A' - B$
 (A) Isomerases (B) Ligases
 (C) Transferases (D) Hydrolases
21. Which of the following is correct pair of pyrimidine bases?
 (A) Adenine and Thymine
 (B) Adenine and Guanine
 (C) Thymine and Cytosine
 (D) Guanine and Cytosine
22. Glycosidic bond exists in DNA molecule between
 (A) Sugar and phosphate
 (B) Any two nitrogen bases
 (C) Sugar and nitrogen base
 (D) Purines and pyrimidines
23. Match the following lists.

	List - I		List - II
i.	Lyases	a.	Enzymes catalyzing hydrolysis of ester, ether, peptide, glycosidic, C-C, C-halide or P - N bonds
ii.	Ligases	b.	Enzymes catalyzing a transfer of a group G between a pair of substrate S and S'
iii.	Hydrolases	c.	They catalyse removal of groups from substrates by mechanisms other than hydrolysis leaving double bonds.
iv.	Transferases	d.	They catalyse the linking together of 2 compounds

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

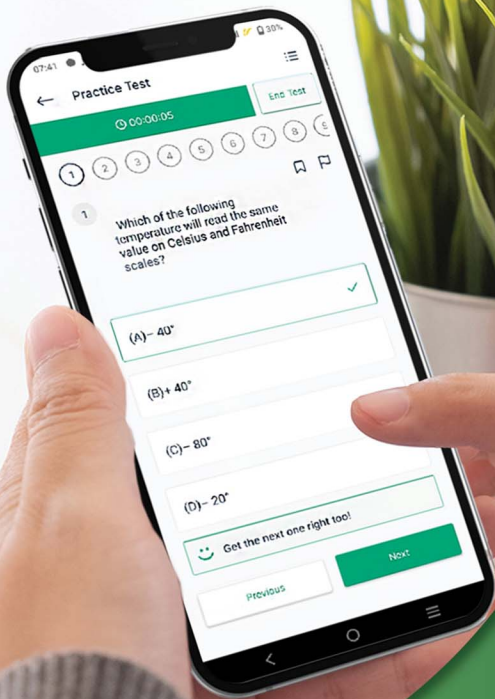


24. The two functional groups characteristic of sugars are
(A) Carbonyl and phosphate
(B) Carbonyl and methyl
(C) Hydroxyl and methyl
(D) Carbonyl and hydroxyl
25. Hemoglobin is a type of _____ protein, which plays indispensable part in respiration.
(A) simple (B) derived
(C) conjugated (D) complex
26. Proteins like Keratin of hair consists of polypeptide chain arranged _____.
(A) like a pleated sheet
(B) like a spiral helix
(C) in linear sequence
(D) in twisted and folded sequence
27. A complex organic nitrogenous compound found in both plant and animal cells is _____.
(A) simple lipid (B) carbohydrate
(C) protein (D) wax
28. Which one of the following is a simple protein?
(A) Histones (B) Lipoprotein
(C) Nucleoprotein (D) Glycoprotein
29. Which type of sugar is present in a nucleotide?
(A) Triose (B) Tetrose
(C) Pentose (D) Hexose
30. Which of the following statement /s are correct about Lipids?
i. Lipids are polymers of fatty acid and glycerol.
ii. White matter of brain has glycolipids in the form of cerebrosides in large quantity.
iii. Fats and oils are triglycerides.
iv. Fatty acids in lipids can be saturated or unsaturated.
v. Lipids are water soluble
(A) v only
(B) i, ii, iii and iv only
(C) i and v only
(D) ii, iii and v only

Answer Key of the chapter: *Biomolecules & Evaluation Test* is given at the end of the book.

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