

**ANEKANT EDUCATION SOCIETY'S**  
**TULJARAM CHATURCHAND COLLEGE OF ARTS, SCIENCE AND COMMERCE**  
**AUTONOMOUS INSTITUTE**  
**QUESTION BANK**  
**Class: T.Y.B.Sc. (Semester – V)**  
**Paper Code: ZOO: 3503**  
**BIOLOGICAL CHEMISTRY      Paper: III      Credit: 4**

**Answer in one sentence:**

1. Define enzyme activity
2. Define reversible enzyme inhibition
3. What is epimerism?
4. What is mutarotation?
5. Define buffering capacity?
6. What is aldose sugar?
7. What is racimization
8. Define holoenzyme
9. Define Enantiomer.
10. State two examples of disaccharides.
11. Buffers in biological system
12. Define ribozymes
13. What is isoenzymes
14. Give two example of aromatic amino acids
15. Define optimum pH for enzyme
16. What is heterodisachharides? Give one example
17. Define non-reducing sugar? Give one example
18. Define-Coenzyme
19. What is chiral centre
20. What are Vander waal's forces?
21. Give two example of polar amino acids?
22. What are anomers? Give example
23. Give the example of 'S' containing amino acids?
24. Name the monosaccharide unit of starch
25. Define-pH
26. What is the primary function of DNA?
27. What are the three parts of a nucleotide?
28. What are the four possible nitrogen bases found in DNA and what are their abbreviations?
29. What is the basic unit of RNA?
30. What is the function of messenger RNA?
31. What is the function of transfer RNA?
32. What are the two features of the tRNA molecule associated, in converting the triplet codon to an amino acid?
33. What is chitin? Give its function.

34. What are phospholipids?
35. What is Chargaff's rule.

**Short answer questions:**

1. What is enzyme inhibition? Explain the competitive enzyme inhibition
2. Explain the structure of water molecule.
3. Explain clinical significance of hypoglycemia & hyperglycemia.
4. What is heteropolysaccharides explain with suitable example
5. Describe the types of non-covalent bonds in biomolecules.
6. Describe isomerism in carbohydrates
7. Explain in short allosteric enzymes
8. Explain influence of enzyme concentration and substrate concentration enzyme activity
9. What are allosteric enzymes? Give their significance
10. Define enzyme inhibition? Explain the non-competitive enzyme inhibition
11. Differentiate between saturated and unsaturated fatty acids
12. Write short note on monosaccharide's
13. Classify enzymes with examples.
14. Compare the forms of DNA
15. What is Isomerism ? Write a note on optical isomerism.
16. What are the three types of RNA and their functions
17. Differentiate between RNA and DNA?
18. What are lipids? Give their types and importance
19. Explain the Structure and properties of starch.
20. Give the theories of enzyme substrate complex formation.

**Write notes on:**

1.  $\beta$  pleated structure of of protein.
2.  $\alpha$  -helix structure of protein.
3. Impact of pH on enzyme activity
4. Secondary structure of protein
5. Explain the concept of buffers with suitable examples.
6. Derive Handerson Hasselbalch equation.
7. Polysaccharides
8. Homopolysacchrides
9. Quaternary structure of protein
10. Lipids
11. Watson & Crick's model
12. Effect of pH and Temperature on enzyme activity
13. Physico-chemical properties of water.
14. Competitive and non competitive inhibitions
15. Clover leaf structure of t-RNA

### Long answer questions:

1. What are carbohydrates? Give an account on classification of carbohydrates with suitable examples
2. What are Enzymes? Explain the effect of substrate concentration, pH & temperature on an enzyme activity?
3. What are proteins? Describe in detail primary and secondary structures of protein.
4. What is essential and non essential amino acids? Give an account on classification of amino acids
5. What are Enzymes? Give the classification of enzymes with example.
6. Define pH ? derive Handerson-Hasselbalch equation and state its applications
7. Elaborate on various type of enzyme inhibition?
8. Describe the different forms of DNA with suitable diagram?
9. Define lipids and classify them with suitable examples.
10. Classify proteins in various ways with suitable examples.
11. Explain factors affecting enzyme activity
12. Explain the Watson and Crick model of DNA. Add a note on different forms of DNA
13. Explain the structure and functions of different type of RNAs.
14. Classify amino acids in various ways with suitable examples
15. Define polysaccharides. Classify them with examples and write their importance.

### MCQs

1. The monomeric unit of nucleic acid are called \_\_\_\_\_
  - a) Nucleotides
  - b) Nucleosides
  - c) Pyrimidines
  - d) Purines
2. Name the pyrimidine base which is found in RNA but not in DNA?
  - a) Thymine
  - b) Uracil
  - c) Adenine
  - d) Guanine
3. The primary structure of DNA and RNA proceeds in which direction?
  - a) 3' → 5'
  - b) 5' → 3'
  - c) 4' → 6'
  - d) 3' → 6'
4. Which bond is used to stabilize the double helix of DNA?
  - a) Hydrophobic bond
  - b) Hydrogen bond
  - c) Covalent bond
  - d) Ionic bond

5. Which of these statements are INCORRECT according to Chargaff's rules?

- a) The molar ratio of A to T or C to G = 1
- b) The sum of purine = sum of pyrimidine
- c) The % C+G  $\neq$  % A+T
- d) The composition of DNA remains the same in all the species

6. The induced fit model was proposed by

- a. Emil fisher
- b. Koshland
- c. Kunhe
- d. Pauling and corey

7. Enzymes

- a. Increase the rate of reaction.
- b. Decrease the rate of reaction
- c. Non protein in nature
- d. All of the above.

8. ----- the first enzyme isolated and purified.

- a. Amaylase
- b. Urease
- c. Pepsin
- d. Ribonuclease.

9. Which of the following is correct

- a. Apoenzyme + Cofactor = Holoenzyme
- b. Apoenzyme - Cofactor = Holoenzyme
- c. Apoenzyme = Holoenzyme + cofactor
- d. None of the above.

10. The unit for Enzyme activity

- a. Katal
- b. Hertz
- c. Bel
- d. Mho

12. Enzymes are

- a. DNA molecule
- b. Carbohydrates
- c. Nucleic acid
- d. Proteins

13. Disulphide bonds are formed between

- a) cysteine residues that are close together
- b) cystine residues that are close together
- c) proline residues that are close together
- d) histidine residues that are close together

14. The primary structure of protein is

- a. Linear sequence of amino acid maintained by hydrogen bond
- b. Linear sequence of amino acid maintained by peptide bond
- c. Linear sequence of amino acid maintained by glycosidic bond
- d. Linear sequence of amino acid maintained by Ionic bond

16. The amino acids acidic in nature are

- a. Aspartate and Glutamate
- b. Lysine and Arginine
- c. Proline and Glycine
- d. Valine and Methionine

17. Which of the following is NOT essential amino acid

- a. Proline
- b. Histidine
- c. Leucine
- d. Methionine

18. The  $\alpha$  helix and  $\beta$  pleated structure was proposed by

- a. Watson and Crick
- b. Pauling and Corey
- c. Kunhe
- d. Emil

19. Name the peptide  $^+H_3N$ -Glutamate-Cystein-Glycine- $COO^-$

- a. Glutamyle-Cysteiny-Glycine
- b. Glutamate-Cysteiny-Glyciny
- c. Glutamate-Cystein-Glycine
- d. None of the above

20. The structure of protein starts from

- a.  $COO^-$  terminal \_\_\_\_\_  $NH_3^+$  terminal.
- b.  $NH_3^+$  terminal \_\_\_\_\_  $COO^-$  terminal
- c.  $OH^-$  terminal \_\_\_\_\_  $COO^-$  terminal
- d. None of the above.

21. The H-O-H bond angle in water molecule is

- a.  $104^{\circ}\text{C}$
- b.  $104.5^{\circ}\text{C}$
- c.  $105^{\circ}\text{C}$
- d.  $105.5^{\circ}\text{C}$ .

22. The oxygen atom in a water molecule bears \_\_\_\_\_ Charge.

- a.  $1\delta+$  charge
- b.  $2\delta+$  charge
- c.  $1\delta-$  charge
- d.  $2\delta-$  charge

23. Which of the following indicates that the pK of an acid is numerically equal to the pH of the solution when the molar concentration of the acid and its conjugate base are equal?

- a. Michaelis-Menten equation
- b. Haldanes equation
- c. Henderson-Hasselbalch equation.
- d. Hardy-Windberg law

24. When the atoms in a molecule are held together by \_\_\_\_\_ bond then they have the strongest chemical linkage

- a. Hydrogen
- b. Covalent
- c. Non-covalent
- d. Ionic

25. Buffers are solutions

- a. always have an acidic pH
- b. always have a basic pH
- c. cause a decrease in pH when acids are added to them.
- d. to maintain a relatively constant pH.

26. pH is

- a. Positive hydrogen
- b. Potential Hydrogen
- c. Positron
- d. Proton of hydrogen

27. The complete transfer of an electron from one atom to another is a property of

- a. Covalent bond
- b. Co-ordinate bond

- c. Ionic bond
- d. Hydrogen bond

38. Buffer is a mixture of

- a. Strong acid and weak base
- b. Strong acid and strong base
- c. Weak acid and their conjugate base
- d. All of the above.

29. The general formula for carbohydrates is

- a.  $(C_2H_2O)_n$
- b.  $(C_4H_2O)_n$
- c.  $(C_6H_2O)_n$
- d.  $(CH_2O)_n$

30. Which of the following is a Non- reducing sugar

- a. Glucose
- b. Fructose
- c. Sucrose
- d. Lactose