

CSIR NET LIFE SCIENCE UNIT 1 Syllabus

MOLECULES AND THEIR INTERACTION RELEVANT TO BIOLOGY

The syllabus starts with CSIR NET UNIT 1, which encompasses key aspects of chemistry and biochemistry, including atomic and molecular structures, chemical bonds, biomolecule composition and function, stabilizing interactions, biophysical chemistry principles, bioenergetics, catalysis principles, protein and nucleic acid conformation, stability, and metabolism of biomolecules.

CSIR NET UNIT 1	Topics
A. Structure of Atoms, Molecules, and Chemical Bonds	<ul style="list-style-type: none">- Atomic structure- Molecular structure- Types of chemical bonds (ionic, covalent, metallic)- Molecular geometry
B. Composition, Structure, and Function of Biomolecules	<ul style="list-style-type: none">- Carbohydrates- Lipids- Proteins- Nucleic acids- Vitamins
C. Stabilizing Interactions	<ul style="list-style-type: none">- Van der Waals forces- Electrostatic interactions- Hydrogen bonding- Hydrophobic interactions
D. Principles of Biophysical Chemistry	<ul style="list-style-type: none">- pH and buffer systems- Reaction kinetics- Thermodynamics- Colligative properties
E. Bioenergetics	<ul style="list-style-type: none">- Glycolysis- Oxidative phosphorylation- Coupled reactions- Group transfer- Biological energy transducers
F. Principles of Catalysis	<ul style="list-style-type: none">- Enzymes- Enzyme kinetics- Enzyme regulation- Mechanism of enzyme catalysis- Isozymes

- G. Conformation of Proteins
- Ramachandran plot
 - Secondary structure (alpha helix, beta sheet)
 - Domains
 - Motifs and folds
- H. Conformation of Nucleic Acids
- Helical structures (A, B, Z)
 - t-RNA
 - Micro-RNA
- I. Stability of Proteins and Nucleic Acids
- Protein stability
 - Nucleic acid stability
- J. Metabolism of Biomolecules
- Carbohydrate metabolism
 - Lipid metabolism
 - Amino acid metabolism
 - Nucleotide metabolism
 - Vitamin metabolism

Tips for studying CSIR NET UNIT 1:

1. **Organize Information:** Create a structured outline or mind map to organize the topics and their interconnections visually.
2. **Understand Fundamentals:** Ensure a strong understanding of basic concepts in atomic and molecular structure, chemical bonds, and biomolecules.
3. **Practice Problem Solving:** Solve problems related to reaction kinetics, thermodynamics, and other quantitative aspects to reinforce theoretical knowledge.
4. **Use Visual Aids:** Utilize diagrams, charts, and models to understand complex structures and interactions, especially in topics like protein conformation and nucleic acid structures.
5. **Focus on Key Concepts:** Identify key principles in each subtopic and focus on mastering them before delving into detailed nuances.