CSIR UGC NET Chemical Sciences - Detailed Rewritten Notes

Inorganic Chemistry

1. Study periodic trends and behavior of elements across the periodic table.

2. Understand molecular shapes, bonding patterns and VSEPR concepts.

3. Learn acid-base theories, HSAB principle and non-aqueous solvents.

4. Focus on main group elements, compounds, preparation and applications.

5. Study coordination compounds, bonding models and magnetic properties.

6. Understand transition and inner transition element chemistry.

7. Explore organometallic compounds, synthesis and catalytic applications.

8. Learn analytical and spectroscopic techniques for inorganic systems.

9. Study bioinorganic chemistry including metalloproteins and metal-based medicines.

10. Understand nuclear chemistry, radioactivity and activation analysis.

Physical Chemistry

1. Master quantum mechanics, atomic orbitals and wave functions.

2. Study approximation methods and their chemical applications.

3. Understand atomic spectroscopy and electronic structure.

4. Learn molecular orbital and valence bond concepts.

5. Study symmetry operations, point groups and group theory applications.

6. Understand rotational, vibrational and electronic spectroscopy.

7. Learn thermodynamics, equilibrium and phase behavior.

8. Study statistical thermodynamics and distribution laws.

9. Understand electrochemistry, redox systems and electrochemical cells.

10. Learn chemical kinetics, reaction mechanisms and catalysis.

11. Study colloids, surfaces and heterogeneous catalysis.

12. Understand solid-state chemistry and crystal structures.

13. Learn polymer chemistry and polymerization principles.

14. Practice data analysis, statistical calculations and error estimation.

Organic Chemistry

1. Learn IUPAC naming rules for organic compounds.

2. Understand stereochemistry and three-dimensional molecular arrangements.

3. Study aromatic compounds and aromatic reaction pathways.

4. Learn formation and reactivity of organic intermediates.

5. Understand addition, substitution and elimination reactions.

6. Study important named reactions and rearrangements.

7. Learn oxidation, reduction and functional group transformations.

8. Understand retrosynthesis and synthetic planning strategies.

9. Study asymmetric synthesis and chiral chemistry.

10. Learn pericyclic and photochemical reactions.

11. Understand heterocyclic chemistry and heteroatom-containing compounds.

12. Study natural products including carbohydrates, proteins and alkaloids.

13. Learn structure determination using modern spectroscopic methods.

Interdisciplinary Topics

1. Applications of chemistry in nanoscience and nanotechnology.

2. Green chemistry approaches and sustainable chemical processes.

3. Medicinal chemistry and pharmaceutical applications.

4. Supramolecular chemistry and molecular recognition.

5. Environmental chemistry and pollution-related studies.