

Department of Computer Science
National Institute of Technology

Broad Syllabus Topics for PhD Entrance Exam

1. Operating Systems
2. Data Structures
3. Algorithms
4. Computer Networks
5. Network and Computer Security
6. Theory of Computation
7. DBMS
8. Computer Architecture
9. C/C++ Programming
10. Engineering Mathematics and General Aptitude.

**Department of Chemistry,
National Institute of Technology, Srinagar.**

Syllabus for M. Phil. /Ph.D. Entrance test-2018

Inorganic Chemistry:

1. Chemical periodicity
2. Structure and bonding in homo- and heteronuclear molecules, including shapes of molecules (VSEPR Theory).
3. Concepts of acids and bases, Hard-Soft acid base concept, Non-aqueous solvents.
4. Main group elements and their compounds: Allotropy, synthesis, structure and bonding, industrial importance of the compounds.
5. Transition elements and coordination compounds: structure, bonding theories, spectral and magnetic properties, reaction mechanisms.
6. Inner transition elements: spectral and magnetic properties, redox chemistry, analytical applications.
7. Organometallic compounds: synthesis, bonding and structure, and reactivity. Organometallics in homogeneous catalysis.
8. Analytical chemistry: separation, spectroscopic, electro- and thermoanalytical methods.
9. Nuclear chemistry: nuclear reactions, fission and fusion, radio-analytical techniques and activation analysis.
10. Bioinorganic chemistry: photosystems, porphyrins, metalloenzymes, oxygen transport, electron- transfer reactions; nitrogen fixation, metal complexes in medicine.

Organic Chemistry:

1. Stereochemistry: Configurational and conformational isomerism in acyclic and cyclic compounds; stereogenicity, stereoselectivity, enantioselectivity, diastereoselectivity and asymmetric induction.
2. Aromaticity: Benzenoid and non-benzenoid compounds – generation and reactions.
3. Organic reactive intermediates: Generation, stability and reactivity of carbocations, carbanions, free radicals, carbenes.