

VEER NARMAD SOUTH GUJARAT UNIVERSITY M.Sc.-I (CHEMISTRY)
PROPOSED SYLLABUS TO BE EFFECTIVE FROM JUNE 2018
PAPER-I (Inorganic Chemistry)

Max. Marks: 100 (External – 70 + Internal – 30)

Total Periods: 45

SEMESTER-I

UNIT-1: Symmetry and Group Theory In Chemistry and Its applications:

12 Periods

Representation of Groups: Preparation of matrices and vectors matrix notations for geometrical transformations, orthogonality theorem and its consequences, reducible and irreducible representations and their relation, preparation of character table for C_{2v} and C_{3v} point groups, Application of group theory to- Transformation properties of atomic crystals.

UNIT-2 :Quantum Mechanics:

11 Periods

Discussion of solution of schrodinger equation to same model system e.g. the one dimensional harmonic oscillator, two particale rigid rotator. Ordinary angular momentum , generalized angular momentum, Eigen functions of aungular momentum, Eigen values of angular momentum, different types of operators and their uses, addition of angular momentum, spin, Russel-Saunders terms and coupling scheme, term separation energies of the p^n and d^n configuration, magnetic effect:spin orbit coupling and Zeeman effect (splitting).

UNIT-3:Inorganic Reaction Mechanism:

11 Periods

Labile ana inert complexes, factors responsible for lability and inertness of complexes.

Reactivity of metal complexes, ligand replacement reaction: classification of mechanism and energy profile of reaction. Inert and Iabile complexes, interpretation of liability and inertness of transition metal complexes on the basis of reaction rate, VBT and CFT.

Transition state or activated complex, substrate, attacking reagents electrophilic and nucleophilic, Nature of central atom. Kinetic application of CFT.

Kinetics of octahedral substitution, acid hydrolysis, factor affecting acid hydrolysis, base hydrolysis, conjugate base mechanism, direct and indirect evidences in favor of conjugate mechanism.

UNIT-4:Metal Clusters:

11 Periods

Introduction , Classification, Carbonyl clusters, Low nuclearity carbonyl clusters, High nuclearity carbonyl clusters, Electron conuting scheme for HNCCS, Wade's rules.

Halides type clusters:Dinuclear clusters, Trinuclear clusters, Tetranuclear clusters, Hexanuclear cluster.

Chevrel phases and Zintl Ions, Carboranes, Metalloboranes, Metallocarboranes, Higher boranes (Hexaborane-10, Decaborane-14) , Number and types of bonds present in higher boranes .

Reference book:

1. Quantum Chemistry by Ira N. Levine, Prentice-Hall of India Pvt. Ltd., New Delhi, 1994.
2. Introductory Quantum Chemistry (Third edition) by N. W. Hanna, Benjamin, Menlo Park, Calif, 1988.
3. Quantum Chemistry and Spectroscopy by M. S. Pathania, Vishal Publications, India, 1981.
4. Chemical applications of group theory by F. A. Cotton (Second edition), Wiley Eastern Limited, 1976 New Delhi.
5. Group theory and its applications by P. K. Bhattacharya, Himalaya Publishing Hours, Mumbai, 1986.
6. Group theory and symmetry by L. R. Hall, McGraw Hill, New York, 1989.
7. 'Kinetic and Mechanism' by A. A. Frost and R. G. Pearson, Wiley, New York, 1953, 1961.
8. Mechanism of Inorganic Reactions by F. Basolo and R. G. Pearson, Second Edition, Wiley Eastern Limited, New Delhi, 1977.
9. Advnced Inorganic Chemistry by F. A. Cotton and R. G. Wilkinson, John Wiley & Sons, N. Y.

- 10.** Principales of Inorganic Chemistry, by Puri. Sharma and Kalia, 33rd Edition, Vishal publishing Co. Jalandhar, Dehli, 2017.
- 11.** Advanced Inorganic Chemistry by S.K.Agarwala and Keemtilal, Pragati Prakashan, Meerut.
- 12.** Advanced Inorganic Chemistry, Volume-II by Gurdeep Raj, Krishna Prakashan Media Ltd., Meerut.
- 13.** Inorganic Chemistry by Gary L. Miessler and Donald A. Tarr, Pearson Education International