

Syllabus of M.Sc. Part-I, Chemistry (D.D.E)

New-Syllabus (From-session: 2014-15)

A.Theory:

400 Marks

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|---------------|-----|
| 1. Paper-I: | 100 |
| 2. Paper-II: | 100 |
| 3. Paper-III: | 100 |
| 4. Paper-IV: | 100 |

B. Practical:

200 Marks

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|----------------|----|
| 1. Physical: | 50 |
| 2. Organic: | 50 |
| 3. Inorganic: | 50 |
| 4. Industrial: | 25 |
| 5. Computer: | 25 |

C. Examination Hour: 4 hrs (Theory papers), 6 hrs (Physical, Organic, Inorganic), 3 hrs (Industrial), 2 hrs (computer)

Paper-1
Physical Chemistry
F.M.-100

- Module-1: Element of Calculus, Extremum Principle, Constrained Extermization, Powerer Series, Fourier Transformation, Vectors and vector Space.
- Module-2: Quantum Mechanics-1:
Postulates and their analysis, Properties of Operators and Commutators, Angular momentum Operator, Equation of Motion, Stationary States, Ehrenfest's Theorems, Barrier Problems
- Module-3: Quantum Mechanics-2:
Bound States, Box with infinite and finite Walls, Harmonic Oscillator(Wave function and Operator method), Hydrogen atom problem, Cartesian and Polar Co-ordinates, Center of Mass and Relative Co-ordinate, Spherical Harmonics, Real and Complex Orbital, Roll of Constant of Motion
- Module-4: Electrochemistry-1:
Debye Huckel Theory, Its modification and Extention, Mean ionic activity Co-efficient, Ion association and precise determination of Dissociation constants of weak electrolite by method of emf and conductance measurement, ion solvent interaction and solvation number
- Module-5: Electrochemistry-2:
Non stationary process in electrolytic solution, Onsagar conduction equation, Effect of high electric field and frequency on ion conductance, Overvoltage , polarography, Amperometric titration, Basic principle of cyclic voltametry and coulometry, polyelectrolyte
- Module-6: Thermodynamics:
Maxwell's relations, thermodynamic equation of state, Partial molar quantities, Thermodynamics of mixing, Activity and fugacity applications ion real systems, Nerst heat theorem, Third Law of thermogynamics, Distribution of molecular velocities, Principal of equipartition of energy, Collission frequency, Thermal conductivity, General diffusion expression and Fick's laws, General features of transport matter(Diffusion), Thermal energy (Thermal conductivity and momentum viscosity)

