Physical Chemistry-II (M = 35)

Unit 1 (M = 20)

Chemical equilibrium: Chemical equlibria of homogeneous
and heterogeneous systems, derivation of expression of
equilibrium constants; temperature, pressure and
concentration dependence of equilibrium constants (K; $K_c'$
$K_x$); Le Chatelier's principle of dynamic equilibrium.

Ionic equilibrium
Ionization of weak acids and bases in aqueous solutions,
application of Ostwald's dilution law, ionization constants,
ionic product of water, pH-scale, buffer solutions and their
pH values, buffer actions; hydrolysis of salts.

Solutions of electrolytes
Electrolytic conductance, specific conductance, equivalent
conductance and molar conductance of electrolytic solutions.
Influence of temperature and dilution on weak electrolytes.

Electrode potential
Electrode potentials, Nemst Equation, reference electrodes:
normal hydrogen electrode and calomel electrodes, Emf of
electrochemical cells and its measurement, electrode
potential series and its applications.

**Unit 2 (M = 15)**

Chemical kinetics and catalysis
Order and molecularity of reactions, rate laws and rate
equations for first order and second order reactions
(differential and integrated forms); zero order reactions.
Determination of order of reactions. Temperature dependence
of reaction rate, energy of activation. Catalytic reactions:
homogeneous and heterogeneous catalytic reactions, enzyme
kinetics.

Colligative properties
Raoult's Law, relative lowering of vapor pressure, osmosis
and osmotic pressure; elevation of boiling point and
depression of freezing point of solvents.

Colloids
Classification of colloids, preparation and purification of

colloids: ferric hydroxide sol and gold sol. Properties of colloids: Brownian motion, peptization, dialysis, Tyndal effect and its applications. Protecting colloids, gold number, isoelectric points, coagulation of colloids by electrolytes, Schulze-Hardy rule.

## Physical Practical-II (M = 15)

- Preparation of buffers and determination of pH of unknown solution
- pH metric titration weak monobasic acid by strong base.