

2.4 Pharmaceutics III (Physical Pharmacy)

1. **Intermolecular forces and States of matter:** Binding forces between molecules, states of matter, the gaseous state, the liquid state, solid amorphous crystalline state, latent heats and vapour pressure, sublimation, relative humidity, phase equilibria and phase rule.
2. **Micromeritics:** Particle size distribution, average particle size number and weight distribution, particle number, methods for determining particle size, optical microscopy, sieving, sedimentation particle volume measurement, particle shape, specific surface methods for determining surface area, permeability method, absorption method, derived, properties of powder, porosity, packing arrangement, densities, bulkness, flow properties.
3. **Solubility & Distribution Phenomena :** Solubility, factors affecting solubility, expression of solubility, dissolution rate, solvent-solute interaction, polar and non-polar solvents, solubility of gases in liquid, liquid in liquid, effect of pressure, temperature salting out, chemical reasons, solubility calculations, ideal and real solution, colligative properties and mol. Wt. determinations, miscibility, influence of foreign substances, dielectric constant and solubility, solubility of solids in liquids, ideal and non-ideal solutions, solution and association in solution, solubility of slightly soluble and weak electrolytes, Handerson haselbatch equation, influence of solvents on the solubility of drugs, combined effect of pH and solvents, preservation, action of weak acids, distribution of solutes between immiscible solvents, effect of ionic dissociation and molecular association on partition co-efficient & drug action.
4. **Surface Phenomena :** Liquid interfaces : Surface and interfacial tension, spreading co-efficient, absorption at liquid surfaces, surface active agents, HLB, solubilisation, detergency, adsorption at solid interfaces, complex films, electrical properties.
5. **Viscosity & Rheology :** Newtonian system – law of flow, kinematic viscosity, effect of temp. non-newtonian system – pseudo plastic dilatic, thixotropy, measurement of thixotropy, thixotropy in formulation, determination of viscosity capillary, falling ball, rotational viscometers.
6. **Colloidal Dispersion & Gels :** Dispersion system size and shape of colloidal particles, pharmaceutical applications, type-lyophilic, lyophobic association colloids, optical, kinetic and electrical properties of colloids, gel-structure properties, applications.

7. **Coarse Dispersion & Emulsions** : Interfacial properties of suspended particles, settling in suspensions, theory of sedimentation – effect of Brownian movement, sedimentation of flocculated particles, wetting of particles, controlled flocculation, flocculation in structural vehicles – Rheological consideration.
8. Complexation & Chelation type of complexes, its application.

PRACTICALS

1. Average particle size determination.
2. Bulk density/ True density.
3. Angle of repose.
4. Partition co-efficient.
5. Methods/surface tension determination method.
6. Methods to determine viscosity of Newtonian and non-newtonian fluids.
7. HLB value determination.
8. Solubility of solid in liquid
9. Solubility of liquid in liquid
10. Rate of sedimentation of flocculated and non-flocculated suspension.

Books recommended:

Cooper & Gunn's Tutorial Pharmacy
Martin Physical Pharmacy
Remington's Pharmaceutical sciences.