Syllabus for Ph. D. Entrance Examination

Department of Pharmaceutical Sciences & Technology, BIT, Mesra

1. (a) Absorptiometric assay of Organic Compounds, Structural Analysis. (b) Theory and instrumentation, of the following: IR, NMR and Mass Spectrometry, Optical Rotatory Dispersion, H.P.L.C, HPTLC, GC and hyphenated techniques (LC-MS), TGA, DTA, DSC and XRD.

2. (a) Structure Activity relationships, mechanism of action and synthesis for following class of drugs: Antimicrobial and Antiviral agents, Antimalarial, Anticancer, Analgesics and Anti-inflammatory agents, Antidiabetics, Cardiovascular and Antifertility agents. (b) Basic concepts of drug design with reference to physicochemical parameters related to ligand and receptor design, QSAR basics like Hansch approach.

3. (a) Basics of stereochemistry including enantiomers, diastereomers, resolution, meso compounds, configuration and its specifications including sequence rule. (b) Reaction Mechanism and principles of Oxidation, Reduction, Aliphatic and Aromatic nucleophillic and Electrophilic substitutions, Addition, Elimination and Rearrangement reactions.

4. Organization of screening for the pharmacological activity of new substances with emphasis on evaluation using in-vivo, in-vitro, ex-vivo, in-situ, in silico toxicity evaluation and other possible animal alternative models.

5. (a) Neurohumoral transmission in CNS and ANS.
   (b) Autacoid Pharmacology.

6. (a) Fundamentals involved in Physical, Chemical and Biological evaluation of crude drugs.
   (b) Monograph preparation of herbal drugs and standard tests involved thereof.

7. (a) Approaches for enhancement of production of secondary metabolites using techniques like tissue culture, r-DNA technology and biotransformation.
   (b) Biological sources, method of preparation, active constituents, adulterants of antidiabetic, Anti-inflammatory, antiasthmatic , antibacterial and anticancer drugs.

8. (a) Preformulation (Physical, Chemical and Biopharmaceutical Characteristics of Medicinal Agent).
   (b) Stability Testing and Dating.
   (c) Diffusion and Dissolution.

9. Product Development Approaches for the Conventional Dosage Form (Tablet, Capsule, Sustained Release Formulation, Injectables, Ointment).

10. Fundamentals, Basic Concepts and Approaches involved in Newer Drug Delivery Systems.

11. Biopharmaceutics: Biopharmaceutical Consideration in drug product Design (Factors influencing Dosage Form Design, Drug Dissolution & Bioavailability. Rate-limiting steps in Bioavailability). Bioavailability Assessment and Bioequivalence Studies.

12. Pharmacokinetics: Principle, Basic concept and Characteristics of Compartment Models. Nonlinear (Dose dependent) Pharmacokinetics.