

## Structure for the Ph.D. entrance examination and Syllabus

### Himachal Pradesh Technical University, Hamirpur, Himachal Pradesh

Note: The Question Paper will include 100 questions, 20 from each section. Time duration will be 2 hours.

#### Syllabus

##### 1. Pharmaceutical Chemistry and Analysis

- a. Basic Fundamentals of Chemistry; Atomic orbitals, Polarity, bonds and terms related to concentration of solution, IUPAC name, Acid base titration, Chromatography.
- b. Introduction of the following: IR, NMR and Mass Spectrometry, Optical Rotatory Dispersion and XRD. Concept of Validation, ISO, BIS, TQM.
- c. Reaction Mechanism: Substitution, Elimination, Addition and Pericyclic.
- d. Structure Activity relationships, mechanism of action for following class of drugs: Antimicrobial and Antiviral agents, Antimalarial, Anticancer, Analgesics and Anti-inflammatory agents, Antidiabetics, Cardiovascular, antidepressant, anxiolytic, diuretic, antihistaminic, analgesic and antifertility agents.
- e. Basic concepts of drug design with reference to physicochemical parameters related to ligand and receptor design, QSAR basics like Hansch approach.
- f. Basics of stereochemistry including enantiomers, diastereomers, resolution, meso compounds, configuration and its specifications including sequence rule.

##### 2. Pharmaceutics

- a. Properties of matter, Concept of Micromeritics, Rheology, Interfacial Phenomena
- b. Concepts of Disperse systems: Emulsion, Suspension, Colloids
- c. Concepts of Dosage form, Prescription, Posology, Isotonicity and incompatibilities and its rectification methods
- d. Concepts of Tablets, Capsules, Aerosol, Liquid orals, Ophthalmic and Parenteral preparations. Concept of chemical kinetics and Stability,
- e. Different methods of sterilization and evaluation of sterile products, sterility testing of pharmaceutical products e.g. sera, vaccines.
- f. Fundamentals, Basic Concepts and Approaches involved in Newer Drug Delivery Systems. Basics of 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.

##### 3. Pharmacognosy

- a. Sources and classification of Drugs: Quality control of Crude drugs

