Part-A (Common for all Specializations - 40 marks)

This part will consist of questions based on general pharmacy and aptitude

Part-B (Specialization - 60 marks)

Pharmacogonsy

Natural Products and Herbal Drug Technology

Basic understanding of alkaloids, glycosides, polyphenolic compounds and volatile oils and plants containing them; Extraction and isolation techniques for phytoconstituents and volatile oils; Quality control of herbal drugs as per WHO, AYUSH and Pharmacopoeial guidelines; Herbal formulation and standardization; Qualitative and Quantitative phytochemical estimation; Chromatography in natural products; Medicinal plant Biotechnology; Principle, procedure and application of Flash Chromatography, HPTLC, HPLC, Spray drying, Lyophilization, GC-MS and LC-MS in natural products, DNA based molecular marker

Pharmaceutical Chemistry & Analysis

Various methods for titration; Applications of optical, and electrical instruments; General principles of spectroscopy, advance methods of analysis; General principles of classification & sources of organic compounds, hybridization, various types of bonding, bond polarization, inductive effects, resonance, and hyper conjugation; Different classes of compounds and laboratory methods of preparations, physical properties & chemical reactions; Concept of aromaticity, synthesis and reactions of different aromatic classes of compounds and polycyclic aromatic hydrocarbons Syntheses & reactions of simple to complex heterocyclic compounds; Stereochemistry, Organometalic chemistry and pericyclic reactions; Carbohydrates chemistry and amino acids & proteins; Structure, Stereo-chemistry, molecular modification and biological activity of natural drug molecules; Systematic study, SAR, Mechanism of action and synthesis of the different classes of drugs included in I.P. and B.P. and U.S.P.; Various synthetic approaches to modern drugs; Mechanism of organic reactions; Drug Design.

Pharmaceutics

Biopharmaceutics: Aspects of formulation development. Pre-formulation and stability studies. Biopharmaceutical evaluation of dosage forms. Bioavailability, bioequivalence studies, dissolution studies and IVIVC. Drug interactions. **Pharmacokinetics:** GI absorption of drugs, rate processes and estimation. Volume of distribution, significance and kinetics. Renal and non-renal excretion. Total body and organ clearance and their significances. Compartment modeling (one and two compartments). Multiple dosing. Calculation of loading and maintenance dose. Steady state and factors affecting steady state. Dose adjustment in renal failure, hepatic dysfunction, geriatric and pediatric patients. Therapeutic drug monitoring. Pharmacodynamics, importance and utility in drug therapy. **Industrial pharmacy (conventional formulations):** Understanding formulation concepts

including the role of excipients used in the preparation and evaluation of following pharmaceutical products – tablets (coated and un-coated), capsules (hard and soft gelatin), solutions, suspensions, emulsions, semisolids, parenterals, aerosols, ophthalmic and nasal formulations and external use products. **Novel drug delivery systems:** Sustained and controlled release principles, dose considerations, physico-chemical and biological properties of drugs relevant to sustained release (SR) formulations. Regulatory affairs concerned with SR products. Assay and bio-pharmaceutical evaluation protocols. Effect of system parameters on controlled release drug delivery. Polymers and controlled drug delivery system development. Oral controlled drug delivery systems: osmotic, membrane-permeation, pH-control, ion-exchange controlled, controlled gel diffusion, hydrodynamic pressure controlled systems, matrix systems, floating systems and multilaminated systems. Mucosal drug delivery systems: buccal, nasal, pulmonary, rectal and vaginal systems. Peptide-based devices. Ocular and periodontal systems. Transdermal drug delivery systems. Implants (subdermal). Parental depot. Disperse systems – multiple emulsions. Intrauterine drug delivery systems. Targeting of drugs through nanoparticles, liposomes, resealed erythrocytes, monoclonal antibodies, magnetic microspheres, microspheres, prodrugs and colon targeting.