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पत्राचार प्रोग

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Syllabus for Entrance Examination for Admission to Ph.D. Program in PHARMACY

- Total no. of questions in the paper : 100
- Max. Marks : 100
- Type of Questions : Multiple-choice

**1. Pharmaceutical and Medicinal Chemistry** No. of questions: 20

Basic organic chemistry regarding synthesis and reactions of the main organic functional groups, organic stereochemistry, substitution (free radical, nucleophilic, electrophilic reactions), elimination reactions; addition reactions; rearrangement reactions, General pathways of drug metabolism, Basic concepts and application of prodrug design, Biochemical mechanism of drugs, categories of drugs with special reference to SAR, mode of action, classification and synthesis of anticancer, NSAIDs, anti-infective, antihistaminic, anxiolytics, sedatives, hypnotics, anticonvulsants, antidepressants, adrenergic antagonists and general anesthetics, anti-malarial, anti-diabetic . Radio-labeling, drug designing and screening, concepts of Computer aided drug design.

**2. Pharmaceutical Analysis** No. of questions: 10

Fundamental principles, basic instrumentation, and pharmaceutical applications of UV-visible spectroscopy, infrared spectroscopy, proton magnetic resonance, <sup>13</sup>C nuclear magnetic resonance, mass spectroscopy, gas-liquid chromatography, HPLC, HPTLC, gel chromatography, electrophoresis and ion-pair chromatography. Introductory principle, instrumentation and application of GC-Mass, HPLC-Mass for complex mixtures. Theory, methods and applications of enzyme and radioimmunoassay techniques, thermo gravimetric analysis (TGA), differential scanning calorimetry (DSC), differential thermal analysis (DTA), X-ray diffraction (XRD), electron microscopy. Stability indicating assay procedures, analytical method development and validation. Impurity profiling, drug estimation in biological samples. Analytical instrument validation.

**3. Basic Pharmaceutics, Drug Delivery and Regulatory Affairs** No. of questions: 30

Micromeritics and powder rheology, surface tension and interfacial phenomena, viscosity and rheology. Identification techniques of microbes, cultivation, isolation of microbes, principles of sterilization. Basic principles of evaporation, distillation, drying, size reduction, mixing, crystallization, filtration and centrifugation. Classification, designing, manufacturing, packaging and evaluation of various dosage forms. Approved conventional and novel formulation excipients. Controlled and novel drug delivery systems, drug targeting. Techniques for in-vitro and in-vivo testing, in-vitro and in-vivo

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correlation. Pre-formulation studies. Physical, chemical and therapeutic incompatibilities. General considerations & concepts of chemical kinetics and drug stability. Biopharmaceutical aspects of dosage form design, principles of pharmacokinetics. Bioavailability and bioequivalence studies, dosage regimens, repetitive dosing and dose adjustments in renal and hepatic failure, individualization of dosage regimen. BCS Classification of drugs, ICH guidelines. Concept of pharmaceutical quality management, requirements of GMP, GLP, GCP, regulatory requirements of drugs and pharmaceuticals.

**4. Pharmacology and Drug Therapeutics**

**No. of questions: 20**

Types of receptors, drug-receptor interaction including signal transduction, mechanism, drug action, side effects, and contraindications of drugs acting on central nervous system, autonomous nervous system, anticancer agents, NSAIDs, anti-infective, anti-diabetic, antihypertensive, anti-asthmatic and antihistaminic. Pharmacological screening, general principles, various screening models, screening methodologies (in-vitro and in-vivo tests). Bioassay methods, principles of toxicology, Chemotherapy and pathophysiology.

**5. Pharmacognosy and Biotechnology**

**No. of questions: 15**

General methods of extraction, isolation, purification and characterization of natural products. Various separation techniques used for isolation of natural products. Biosynthetic pathways of various metabolites (e.g. Alkaloids, glycosides, tannins, lignans, saponins, lipids, flavonoids, coumarins, anthocyanidines etc.) Quality control of crude drugs, photochemical screening methods, plant tissue culture. Recombinant DNA technique, Fermentation, Immunology and vaccines. Enzyme immobilization, Genetics and gene therapy, Fundamentals of cell and molecular biology.

**6. Statistics & Research Aptitude**

**No. of questions: 5**

National and international scenario of pharmaceutical research, literature reviewing, reference citation, scientific and research journals, impact valuation, research article and patent drafting, various scientific websites, abstracts, Pharmacopoeial drug monographs and official standards, national and international research institutions of repute.

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