

Pharmaceutical Science

Ph.D. Entrance Test - SYLLABUS

RESEARCH METHODOLOGY

Writing a research proposal

Research grant funding agencies, preparing application to problems, objectives, how to design of study. measurement procedures, analysis of data; organizations of report, —acing data table, graph and charts)

Review of Research Literature: Purpose and use of literature review, locating relevant information, use of library & electronic databases, preparation & presentation of literature review, research article reviews, theoretical models and frame work. Identification of gaps in research, formulation of research problem, definition of research objectives.

Research Design

Qualitative Methods: Types of hypothesis and characterization. Quantitative Methods: Statistical methods for testing and evaluation. Characterization of experiments: Accuracy, reliability, reproducibility, sensitivity, Documentation of ongoing research.

Research Publication & Presentation

Thesis, Research paper, Review Article & Technical Reports: Organization of thesis and reports, formatting issues, citation methods, references, effective oral presentation of research. Quality indices of research publication: impact factor, immediacy factor, Hindex and other citation indices.

Research Ethics and Morals

Issues related to plagiarism, collaborative models and ethics, acknowledgements. Intellectual Property Rights: copy rights, copy left: patents, Industrial designs, Trademarks.

Part- 2

PHARMACEUTICAL SCIENCES

Natural Products

Pharmacognosy & Phytochemistry- Chemistry, tests, isolation, characterization and estimation of phytopharmaceuticals belonging to the group of Alkaloids, Glycosides, Terpenoids, Steroids, Bioflavanoids, Purines, Guggul lipids. Pharmacognosy of crude drugs that contain the above constituents. Standardization of raw materials and herbal products, WHO guidelines, Quantitative microscopy including modern techniques used for evaluation. Biotechnological principles and techniques for plant development, Tissue culture.

Pharmacology

General pharmacological principles including Toxicology. Drug interaction. Pharmacology of drugs acting on Central nervous system, Cardiovascular system, Autonomic nervous system, Gastro intestinal system and Respiratory system.

Pharmacology of Autocoids, Hormones, Hormone antagonists, chemotherapeutic agents including anticancer drugs. Bioassays, Immuno Pharmacology. Drugs acting on the blood & blood forming organs. Drugs acting on the renal system.

Medicinal Chemistry

Structure, nomenclature, classification, synthesis, SAR and metabolism of the following category of drugs, which are official in Indian Pharmacopoeia and British Pharmacopoeia. Introduction to drug design. Stereochemistry of drug molecules. Hypnotics and Sedatives-SAR of Benzodiazepines, Barbiturates, synthesis of barbital; Analgesics-SAR of morphine analogues, synthesis of methadone; NSAIDS- Synthesis of ibuprofen; Neuroleptics, Antidepressants- SAR of Tricyclicantidepressants, synthesis of amphetamine, fluoxetine; Anxiolytics, Anticonvulsants, Local Anaesthetics- SAR of Benzoic acid and aniline derivatives & phenothiazines, synthesis of benzocaine, phenytoin, carbamazepine; Antihistaminics, Cardio Vascular drugs — Antianginal agents-synthesis of isosorbide dinitrate, Cardiotonic agents-SAR of cardiac glycosides and synthesis of dobutamine, Antihyperlipidemic agents-SAR of HMG-CoA reductase inhibitors, Antihypertensive drugs-SAR of ACE inhibitors and dihydropyridines, synthesis of nifedipine, amlodipine, atenolol, captopril, Coagulants, Anticoagulants, Antiplatelet agents-synthesis of warfarin, aspirin; Diuretics-SAR of thiazide diuretics, Adrenergic & Cholinergic drugs, Oral Hypoglycemic agents-synthesis of tolbutamide; Chemotherapeutic agents — β -Lactam Antibiotics-SAR of penicillin and cephalosporins, Antibacterials-SAR of Tetracyclines, aminoglycosides and synthesis of chloramphenicol, Antiviral-synthesis of amantadine, Antitubercular-synthesis of isoniazid, ethambutol, pyrazinamide, Antiamoebic drugs & Antimalarial- SAR of quinolines and synthesis of chloroquine, primaquine, pyrimethamine, metronidazole; Anticancer-Synthesis of chlorambucil, cyclophosphamide, thiotepa, fluorouracil. Diagnostic agents. Preparation and storage and uses of official Radiopharmaceuticals, Vitamins and Hormones.

Pharmaceutics

Development, manufacturing standards Q.C. limits, labeling, as per the pharmacopoeial requirements. Storage of different dosage forms and new drug delivery systems. Biopharmaceutics and Pharmacokinetics and their importance in formulation. Formulation and preparation of cosmetics — lipstick, shampoo, creams, nail preparations and dentifrices. Pharmaceutical calculations.

Pharmaceutical Jurisprudence

Drugs and cosmetics Act and rules with respect to manufacture, sales and storage. Pharmacy Act. Pharmaceutical ethics.

Pharmaceutical Analysis

Principles, instrumentation and applications of the following: Absorption spectroscopy (UV, visible & IR). Fluorimetry, Flame photometry, Potentiometry. Conductometry and Polarography. Pharmacopoeial assays. Principles of NMR, ESR, Mass spectroscopy. X-ray diffraction analysis and different chromatographic methods.

Biochemistry

Biochemical role of hormones, Vitamins, Enzymes, Nucleic acids, Bioenergetics. General principles of immunology. Immunological. Metabolism of carbohydrate, lipids, proteins. Methods to determine, kidney & liver function. Lipid profiles.

Microbiology

Principles and methods of microbiological assays of the Pharmacopoeia. Methods of preparation of official sera and vaccines. Serological and diagnostics tests. Applications of microorganisms in Bio-Conversions and in Pharmaceutical industry.

Clinical Pharmacy

Therapeutic Drug Monitoring, Dosage regimen in Pregnancy and Lactation, Pediatrics and Geriatrics. Renal and hepatic impairment. Drug — Drug interactions and Drug — food interactions, Adverse Drug reactions. Medication History, interview and Patient counseling.