

SRI RAMACHANDRA UNIVERSITY

(Declared under Section 3 of the UGC Act, 1956)

Porur, Chennai - 600 116

SYLLABUS FOR Ph.D. ENTRANCE EXAMINATIONS

SECTION II - FACULTY OF PHARMACY

1. Properties of matter, micromeritics, surface and interfacial phenomenon, viscosity, rheology, dispersion systems - principles, properties and applications, classification, preparation, analysis and applications of complexes, kinetics and drug stability. Stoichiometry, Importance of unit processes in manufacturing - fluid flow, heat transfer, evaporation, distillation, drying, size reduction, mixing, filtration and centrifugation, crystallization, humidity control, refrigeration and air conditioning. Materials of plant construction, material handling systems, automated reactors, computer aided manufacturing, industrial hazards and safety systems.
2. Basic terminologies and essentials of anatomy and physiology of the osseous system, skeletal muscle, haemopoietic system, lymph and lymphatic system, cardiovascular system, digestive system, central nervous system, urinary and endocrine system. Basic principles and mechanism of cell injury, adaptation, process of inflammation, pathophysiology of diabetes, peptic ulcer, asthma, hepatic disorders, rheumatoid arthritis, congestive heart failure, tuberculosis, renal failure, AIDS and common types of neoplasms. Classification, identification and control of microbes, methods of sterilization, principles of immunity, types of immunological products, genetic recombination, microbial transformation, methods of - enzyme, plant cell and bacterial immobilization, antimicrobial spectrum and fermentative production of antibiotics.
3. Design, formulation, packaging and evaluation of liquids, semi-solid dosage forms, galenicals, suppositories, pharmaceutical aerosols, ophthalmic preparations, capsules, micro capsules, tablets, parenterals, cosmetics, blood products, plasma substitutes and surgical products. Pre-formulations parameters, ICH guidelines for stability testing, performance evaluation methods. Elementary introduction to novel drug delivery systems.
4. Prescription handling, recording and reporting procedures, posology, allegation and alcohol dilution. General dispensing procedures, physical and chemical incompatibilities between drug substances, their rectification, therapeutic incompatibilities. Community pharmacy units, Organization and structure of hospital pharmacy, hospital formulary, drug inventory control, hospital drug distribution systems, central sterile supply unit management, drug information services and nuclear pharmacy. Roles and responsibilities of community and hospital pharmacist.

5. Drugs and Cosmetics Act 1940 and Rules 1945, Drugs Prices Control order, Patents Act 1970, Pharma marketing, elements of market research, materials and production management, GMP, GLP, Quality assurance, TQM, validation - equipment, process and analytical methods, basics of drug regulatory affairs.
6. Methods of preparation, uses, sources of impurity, tests for purity and limit tests for the following classes of inorganic pharmaceuticals of Indian Pharmacopoeia: Gastrointestinal agents, electrolytes, essential and trace elements, topical agents, oxygen, anaesthetics, dental products, buffers and radiopharmaceuticals. Fundamentals of physical chemistry of importance to pharmacy - Kinetic theory of gases, colligative properties, partition coefficient, thermochemical equations, photochemistry, chemical kinetics, thermodynamics and quantum mechanics.
7. Fundamentals of organic chemistry of importance to pharmacy: Atomic structure, orbital theory, wave equation, types of orbitals and bonds, polarity of molecules, intermolecular forces, acids and bases, isomerism and stereo isomerism, stereo specific reactions, nucleophilic and electrophilic - addition and aromatic substitution reactions, elimination reactions and neighboring group effects.
8. Bioenergetics and ATP production, enzymes, co-enzymes, iso-enzymes and co-factors. Carbohydrate and lipid metabolism, citric acid cycle, biological oxidation, metabolism of ammonia and nitrogen containing monomers, formation of deoxy ribonucleotides, purine, pyrimidine and nucleic acid biosynthesis, mutation, genetic code and protein synthesis.
9. Methods of synthesis, physico chemical properties, mode of action and structure activity relationships of the following classes of drugs: Cholinergics, anti-cholinergics and cholinesterase inhibitors, adrenergics, antispasmodics, anti ulcer drugs, local anaesthetics, neuromuscular blocking agents, autocoids, steroids, diuretics, cardiovascular drugs, thyroid and anti thyroid drugs, insulin and oral hypoglycemic agents, CNS drugs, anti-metabolites, anti-neoplastic agents, anti-viral agents, immunosuppressives, diagnostic agent and pharmaceutical agents. Bio isosterism, drug-receptor interactions, drug metabolism, pro-drug concept, Approaches to drug design - analog based, mechanism based and QSAR based. Computer aided drug design and molecular modeling.
10. Types of errors, statistical treatment of data, precision and accuracy, fundamentals of volumetric analysis, acid-base titrations, oxidation-reduction titrations, precipitation titrations, gravimetric analysis, non-aqueous titrations, complexometric and diazotization titrations. Potentiometry, conductometry, coulometry, polarography, amperometry, gasometry and chromatography. Principles, instrumentation and applications of UV-VIS, IR, NMR and Mass spectrophotometry, flame photometry, fluorimetry, atomic absorption spectroscopy, x-ray diffraction analysis and radio immunoassay.

11. Routes of drug administration, mechanism of action of drugs, tolerance, dependence, ADME of drugs, bioassays and biological standardization, principals of basic and clinical pharmacokinetics, bioavailability and bioequivalence. Pharmacology of drugs acting on peripheral nervous system, central nervous system and cardiovascular system, hemopoietic system, urinary system, respiratory system, gastrointestinal system, endocrine system and autocooids. Basic concepts of toxicology and pharmacotherapy, general principles of chemotherapy –antibiotics, anti infectives, anthelmintics, anti-neoplastics and immunosuppressants. Drug delivery systems and their biopharmaceutic, therapeutic considerations, individualization of drug therapy – infants, elderly and in pregnancy, drug induced diseases, drug interactions, common clinical laboratory tests and their interpretation, management of important disorders of organs and systems.

12. Natural sources of drugs, their classification, factors influencing crude drug cultivation, collection, processing and storage, WHO guidelines for quality control of crude drugs, classification, properties and general methods of isolation of plant active constituents. Systematic pharmacognostic study of crude drugs under the following categories: carbohydrates, lipids, resins, tannins, volatile oils, fibers, saponins, cardioactive glycosides, anthraquinone cathartics, miscellaneous glycosides and alkaloid containing drugs. Holistic concept of drug administration in Traditional medical systems, introduction to ayurvedic dosage forms and traditional drugs. Role of plant-based drugs in the national economy, Indian institutes and industries working on medicinal and aromatic plants, worldwide trade, production and utilization of - quinine, sennosides, digoxin, tropane alkaloids, diosgenin, papain, liquorice, ginseng, aloe, valerian, rauwolfia, plant based laxatives, sandalwood oil, lemon grass oil and eucalyptus oil. Biogenesis of secondary metabolites of pharmaceutical importance, principles of plant tissue culture, marine pharmacognosy, herbs as health foods and herbal cosmetics.

Books recommended

1. The Science and Practice of Pharmacy by Remington
2. Bentley and Driver's Text Book of Pharmaceutical Chemistry by Atherden L M

Reference books

1. A Text book of Biochemistry by Rama Rao
2. Medicinal Chemistry by Foye
3. Essentials of Medical Pharmacology by Tripathi DK
4. Text book of Pharmcognosy by Trease and Evans
5. Pharmcognosy: An Indian Perspective by Mangathayaru K
6. Dispensing for Pharmaceutical Students by Carter S
7. Introduction to Pharmaceutical Dosage Forms by Ansel H C
8. The Theory and Practice of Industrial Pharmacy by Lachman L, Lieberman