

Syllabus for written test for selecting Junior Scientific Officer.

- I. Study of Development of IP, BP, USP, European Pharmacopeia and Indian National Formulary
- II. Study of different types of weights and measures, calculation involving percentage of solutions, allegation, proof spirit, isotonic solutions.
- III. Study of physical properties of polarity and dipole moment hydrogen bonding and its application and protic and aprotic solvents.
- IV. Study of Surgical Aids, powders and granules, Monophasic Dosage forms, Biphasic Dosage forms.
- V. General methods of preparation of Medicinal Gases and Gastro Intestinal Agents, Dermatological preparations.
- VI. Study of Physical properties of Drug Molecules, Rheology.
- VII. Classification study of Microbes.
- VIII. Study on Sterilization, Disinfections, Genetic Engineering, Fermentation and Micro Biological Assay.
- IX. Study on Bio Energetics, Enzymes and Co-enzymes, Nucleotides and Nucleic Acids.
- X. Identification of organic compounds belonging to the following classes by systematic qualitative organic analysis- phenols amides, carbohydrates, amines, carboxylic acids, Aldehydes and ketones, esters, and hydrocarbons.
- XI. Principles of Drug Design.
- XII. A brief view on Drugs and Pharmaceutical Industry.
- XIII. A study of the Drugs & Cosmetics Act, 1940 and Rules 1945, ,
- XIV. Study of principles of redox titrations, theory of non aqueous titrations, principles of precipitation titration and complexometric titration.
- XV. Study of fluid flow, heat transfer, size reduction, mixing, crystallization.
- XVI. Study of General Pharmacology of route of administration, biotransformation and excretion, mechanism of drug action, drug toxicity, preclinical and clinical evaluations.
- XVII. Pharmacology of drugs acting on autonomous nervous system, cardio vascular system and central nervous system, blood and blood forming agents,

- XVIII. Formulations of tablets, capsules, preparations of parenterals, ophthalmic formulations, aerosols, radiopharmaceuticals, biopharmaceutics,
- XIX. Study of analytical techniques w. r. t UV, IR, HPLC, Column chromatography, TLC, Paper chromatography, gas chromatography, Electrophoresis, Fluorimetric analysis.
- XX. Study of Pharmacology of chemotherapy, hormones and hormone antagonists,
- XXI. Bioassay, immune-pharmacology and principles of toxicology
- XXII. Study of preservatives, antifungal agents, antiviral agents, anti-neoplastic agents, and antibiotics
Brief study on control delivery system and novel drug delivery system,
- XXIII. Study of validations and calibration.
- XXIV. Brief study on Good manufacturing practices, (Sch M), Good laboratory practice, (Sch L), WHO guidelines, US FDA guidelines, TGA Guidelines, ICH guidelines.

SYLLABUS : PHARMACOGNOSY ✓

1. Importance of the following analytical methods in the qualitative, quantitative and structural elucidation of pharmaceutical compounds:
 - a) Optical Rotatory Dispersion
 - b) Spectrophotometric methods with emphasis on NMR including 2D & C¹³
 - c) Mass and HPLC.

2. A) General methods of isolation, purification, identification and estimation of different classes of phyto-constituents. WHO guidelines for assessment and quality control of crude drugs, extracts and formulations.
B) Herbal based industries: i. types, forms, scope and applications ii. infrastructure requirements, research needs and areas, quality assurance in herbal drug industry. iii. Study of herbal formulations and cosmetics.
C) Marine pharmacognosy

3. A) General aspects involved in the cultivation of medicinal plants. Chemotaxonomy.
B) Phytochemical study of various class of phyto-constituents including important drugs: Alkaloids, glycosides, steroids and phospholipids. Structural elucidation of Nicotine, Atropine, Morphine, strophanthidine, cholesterol and citral.
C) Complementary and alternative system of medicines.

4. A) Plant tissue culture: Types, techniques and applications, production of secondary metabolites, Germ plasm conservation, Biotransformation and transgenic plants and their applications.
B) Enzymes: Types, methods of isolation and purification, Immobilization of enzymes and their applications. Plant derived enzymes
C) Methods of improving quality of crops and their applications using plant breeding, chemodemes, hybridization, mutation and polyploidy.
D) i. Gene transfer in plants: Vector mediated and direct gene transfer techniques. ii. Gene mapping and molecular maps of plant genomes including chromosome analysis, PCR, molecular maps and physical maps using in-situ hybridisation.