Syllabus for the post of Assistant Controller Drugs.

Pharmaceutical Chemistry I (Inorganic Chemistry)

- Introduction to Pharmacopoeia and monograph
- Quality Control and test for purity.
- Study of pharmaceutically important compounds
- Theory of co-ordination compounds with special reference to application in Pharmacy and Pharmaceutical analysis
- Test for purity of swelling property of bentonite, Acid neutralizing capacity of aluminium hydroxide gel, etc.
- Determination of specific rotation of a compound, refractive index and partition co-efficient.

Pharmaceutical Analysis I

- Neutralization titrations
- Non-aqueous titrations
- Precipitation titrations
- Complexometric titrations
- Oxidation – reduction titrations
- Gravimetric analysis
- Miscellaneous methods

Pharmaceutical Chemistry II (Chemistry of Natural Products)

- Carbohydrates, Proteins and Amino acids
- Terpenoids, Alkaloids and Glycosides
- Vitamins and Purines
- Fats and Oils
- Steroids
- Estimation

Pharmaceutical Jurisprudence

- Introduction, Definition and scope of Forensic pharmacy. Pharmaceutical legislation in India and historical developments.
- A detailed study (a) Pharmacy Act. (b) Drugs and Cosmetics Act. (c) Medicinal and Toilet preparations (Excise Duties) Act and Rules. (d) Narcotic Drugs and Psychotropic Substances Act. (e) Drugs and Magic Remedies (Objectionable Advertisements) Act. (f) Drugs Prices Control Order.

Pharmacognosy

- Study of the biological sources and traditional drugs.
- Introduction to alternative systems of medicine.
- Systematic study of source.
- General techniques of biosynthetic studies and basic metabolic pathways.

- Introduction, classification and study of different chromatographic methods and their applications.
- Preparation of the extracts and various extraction techniques including supper critical fluid extraction.
- Marine pharmacognosy, novel medicinal agents from marine sources.
- Plant allergens and allergenic substances. Classification and preparation of allergenic extracts.
- Biological sources, preparation, identification tests and uses of the following enzymes: Diastase, Papain, Bromelain, Maltase
- Protein containing drugs: Gelatin, Collagen, spirulina
- Introduction to herbal drug technology. Development and evaluation of herbal formulations.
- Adulteration and evaluation of crude drugs.
- Herbaceous health foods.
- Herbal cosmetics – including classifications with examples.
- Patenting of Herbal Drugs
- Estimation of phytopharmaceuticals : Atropine, Quinine, Curcumine, Aloin, Caffeine.
- Physicochemical evaluation of crude drugs and formulations including ash values, extractive values, refractive index.

Pharmacology-I & Biopharmaceutics

Pharmacology

- General Pharmacology.
- Drug dose & dosage: Fixed dose combination -Advantages & disadvantages.
- Rational use of medications.
- Pharmacogenetic variation in drug action
- Principles of Toxicology.
- Pharmacology of drugs in special groups- Pregnancy, lactation pediatrics and elderly.
- Chrono pharmacology
- Pharmacology of different classes of drugs.

Biopharmaceutics

- Biotransformation – phase I and phase II reactions
- Compartment models- Definition, One compartment model- IV Bolus, IV Infusion, Extra Vascular administration
- Non-linear pharmacokinetics- One compartment model IV Bolus administration, Michaelis Menten equation.
- Measurement of Bioavailability- Cmax, t max, AUC. Design of single dose Bioequivalent study, dissolution and disintegration

Pharmacology-I & Clinical Pharmacy

Pharmacology

- Measurements in pharmacology
- Drug discovery and new drug development
- Pharmacology of certain groups of drugs

- Antimicrobial drugs & Chemotherapy
- Immuno pharmacology.

Clinical Pharmacy

- Drug & Poison information services
- Clinical pharmacokinetics & individualization of drug therapy
- Adverse drug reactions: Detection, monitoring & reporting of ADRs.
- Definition and implications of Evidence based medicine, Practice based research & laboratory based research
- Preparation of drug profiles, leaflets, packaging inserts.
- Drug interactions: clinical significance, potentially dangerous interactions, role of pharmacist in identification, assessment and ways to overcome interactions.
- Concept of Essential drugs and rational drug use.
- Clinical management

Pharmaceutical Chemistry III (Medicinal Chemistry)

- Basic Concepts and Applications of Prodrug Design
- Study of Classification, Mechanism of Action, uses and Structure of selected drugs

Pharmaceutical Analysis II

- Chromatography
- Potentiometric titrations: Introduction, Electrochemical cells, half-cells, electrodes, measurement of potential and application in pharmaceutical analysis
- Conductometric titrations: Basic concepts, different types of conductometric titrations, apparatus used and applications in Pharmaceutical Analysis.
- Thermal Analysis: Basic Concepts and Applications in Pharmaceutical Analysis.
- Polarography, Amperometry and Electrophoresis.
- Turbidimetry and Nephelometry
- Theoretical aspects, basic instrumentation, elements of interpretation of spectra.

Pharmaceutics and Microbiology

Pharmaceutics

- Tablets Characteristics, advantages and disadvantages. Types of tablets, excipients, granulation methods and machinery involved.
- Tablet coating: Types-sugar coating, film coating, compression coating, electrostatic and enteric coating.
- Capsules: Advantages and disadvantages of capsules.
- Sterile products
- Pharmaceutical aerosols: components, propellants, containers, valves and actuators, types of aerosol systems, manufacture, quality control, pharmaceutical applications.
- Surgical ligatures and sutures, types, Catgut-preparation and standardization. Cotton-absorbent and non-absorbent
- Blood products and plasma.
- Packaging materials. Types of glasses and plastics employed for packing and their evaluation.
- Introduction, fundamentals of cosmetic science.

- Controlled drug delivery systems
- Process validation and performance evaluation.
- Pharmaceutical calculations.

Microbiology

1. Introduction to the scope of microbiology,

Microscopy-compound, dark field, phase contrast, UV, fluorescence and electron microscopy.

2. Classification of microbes and bacterial taxonomy. Elementary study of important pathogenic microorganisms, biochemical methods for identification.

a) Structure of bacterial cell. Endospores and mechanism of spore formation. L forms. Identification methods of microbes; stains and types of staining techniques. b) Bacterial Nutrition, cultivation of bacteria. Culture media, its classification with examples. Aerobic and anaerobic culture methods. Isolation of Pure culture. c) Classification & Structure of Viruses. Cultivation of Viruses, Viral replication. Virus-Host interactions. Bacteriophages, phage typing. Bacteriocins. d) Introduction to fungi of Medical and pharmaceutical importance. Fungal reproduction and cultivation.

3. Immunity.

a) Immunological Preparations: Principles, Antigens and Haptens, Immune System, Cellular and Humoral Immunity, Antibodies, Immunological Tolerance.Hypersensitivity. Active and Passive immunization, Vaccines and Sera, their preparation, standardization and storage. Development of Hybridoma for Monoclonal Antibodies.

b) Antigen – Antibody reactions and their applications.

4. Control of microbes by Physical and Chemical methods:

a) Disinfection, factors influencing disinfectants, dynamics of disinfection, Evaluation of Disinfectants.

b) **Sterilisation**- different methods, validation of sterilisation methods and equipments. Sterility testing of pharmaceutical products as per the IP.

a) Antibiotics: Antimicrobial Spectrum and methods used for standardization. Microbial assay of antibiotics.

b)Fermentation technology; Basic principles of fermentation, isolation and screening of industrially important microbes, types of fermentation, downstream process, Fermenter design and control of different parameters. Fermentation process. Screening of soil for organisms producing antibiotics. Extraction of fermentation products with special reference to Penicillin,alcohol , amylase and Vitamin B12.