

Health Department
Drugs Control Laboratory Bihar

Syllabus for Scientific Assistant
(Pharmacy/Pharmaceutical Sciences)

Format of Examination-

1. All questions will be multiple choice questions (MCQ) type.
2. Each multiple-choice questions (MCQ) will carry four (04) marks for each correct answer.
3. There will be negative marking for incorrect answer, one (01) mark will be deducted for each incorrect answer.
4. Total duration- 02 hours.

Sr. No.	Subject	Total Marks	Total Questions	Exam Type	Time Duration
1	Pharmacy/Pharmaceutical Sciences	400	100	Objective Type	2 Hours

Historical background and development of Profession of Pharmacy and Guidelines:

- History of Profession of Pharmacy in India in relation to Pharmacy Education, Industry, and Organization. Pharmacopoeias: Introduction to IP, BP, USP, NFI, and Extra pharmacopoeia. Brief Study on GMP, GLP, USFDA Guidelines, ICH Guidelines, WHO Guidelines.

Forensic Pharmacy

- Drugs and Cosmetic Act, 1940
- Pharmacy Act, 1948
- Drugs and Magic Remedy Act, 1954
- Medical and Toilet Preparation Act, 1955
- Prevention of Cruelty to Animal Act
- Drug Price Control Order, 1995
- Medical Termination of Pregnancy Act, 1971
- Poison Act, 1919 and Dangerous Drugs Act, 1930
- Trademark Registration Act
- Pharmaceutical Ethics

Manufacturing Pharmacy

- Tablet and Tablet Coating
- Capsule
- Blood Fluid and Electrolytes
- Parenteral Preparation and Quality Control
- Emulsion, Suspension
- Ointment and Cream
- Ophthalmic Solutions
- Surgical Dressing
- Biological Preparation (Vaccine, Sera, and Anti - Sera)
- Biopharmaceutics

Cosmetics

- Formulation and Preparation of the Following Cosmetics Preparations-Lipsticks, Shampoo, Cold Cream, Vanishing Cream, Tooth Paste, Hair Dyes and Sun Screen.

Pharmaceutical Chemistry/Analysis

- Limit Test
- Bio-Assay
- Sterility Test
- Pyrogen Test
- Theory & Application of Colorimeter, Fluorimeter, Nephelometer, and Turbidimeter, Electrophoresis.
- Karl Fischer Titration
- Alcohol Determination

- Microbiological Assay of Vitamins, Antibiotics, and Vaccine Preparations
- Study of Analytical Techniques w. r. t. UV, IR, HPLC, AAS, GC, TLC

Medicinal Chemistry

Definition, classification. Structure, preparation, brand name and storage of the following classes of drugs:

- Steroids
- Antihistaminic Agents
- Sedatives and Hypnotics
- Psycho-therapeutic Agents
- Analgesics
- Cardiovascular Agents

Pharmacognosy

Source, Chemical Constituents, uses, and adulteration of the following classes of natural drugs:

- Rauwolfia
- Ipecacuanha
- Belladonna
- Cinchona
- Aloe
- Noxvomica
- Cinnamon
- Digitalis
- Opium
- Kurchi
- Brahmi
- Tulsi
- Bael and Ephedra

Pharmacology & Toxicology

- Introduction and General Principle, Mode of Action
- Drug Receptor Interaction
- Drug Antagonist
- Metabolism, Excretion, and Distribution of Drugs
- Routes of Administration
- Bioavailability
- Drug Dependence and Addiction
- Adverse Drug Reaction, Drug Abuse, Drug Toxicity
- Drug Allergy
- Biostatistics

Hospital and Clinical Pharmacy

- Handling of Prescription

- Incompatibility
- Storage Conditions of Drugs
- Clinical Pharmacy

Anatomy, Physiology & Health Education

Basic knowledge the following is required:

- Circulatory System
- Digestive System
- Sense organs
- Reproductive System
- Urinary System
- Respiratory System
- Nervous System

Health Education

- Nutrition
- First Aid
- Population Control
- Aids Control

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Syllabus for Scientific Assistant
(Chemistry)

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Sr. No.	Topic From	Marks	Questions
1	Unit-I	40	10
2	Unit-II	80	20
3	Unit-III	40	10
4	Unit-IV	40	10
5	Unit-V	40	10
6	Unit-VI	40	10
7	Unit-VII	80	20
8	Unit-VIII	40	10
	Total	400	100

*****Note: Marks distribution may vary from each unit.**

UNIT-I

(a) Chemical Kinetics:

Rate laws - rate constant - order and molecularity of reactions - I, II, III, and zero order reactions - concept of Arrhenius theory - Collision theory and Transition state theory - catalysis.

(b) Electrochemistry:

Conductance in electrolytic solution, specific and molar conductance - Ostwald's dilution law - Kohlraush's law - Debye Huckel theory - Types of reversible electrodes - Nernst equation - reference electrode and standard hydrogen electrode - computation of cell e.m.f. - calculations of thermodynamic quantities of cell reactions (ΔG , ΔH , ΔS and K) - Determination of pH and pKa of acids by potentiometric methods.

UNIT-II

(c) Analytical chemistry and Instrumental methods:

Principle, instrumentation and applications of UV-Visible, IR, HPLC, Mass, GCMS and Atomic Absorption spectroscopy. Theory & Application of Colorimeter, Fluorimeter, Nephelometer, and Turbidimeter, Electrophoresis. Karl Fischer Titration, Potentiometric Titration, TLC.

UNIT-III

Inorganic Chemistry:

(d) **Periodic classification:** Classification based on electronic configuration - periodic properties - atomic and ionic radii, ionisation potential, electron affinity and electronegativity - various scales - Trends along periods and groups.

(e) **Chemical bond:** Lattice energy - VSEPR Theory and its applications - partial ionic character from electronegativity - Fajan's Rule.

(e) **Compounds of Boron:** Electron deficient nature of boron compounds - preparation and properties of halides and nitrides of boron - diborane - Borazine, silicones and structures of silicates.

UNIT-IV

Organic Chemistry:

(f) **Nature of Bonding:** Hybridisation (sp , sp^2 and sp^3) and Geometry of molecules - cleavage of bonds - homolytic and heterolytic fission of carbon - carbon bonds - Reaction intermediates - free radicals, carbocations and carbanions - their stability.

(g) **Types of reactions:** Nucleophilic, electrophilic, free radicals, addition, elimination, substitution, oxidation and reduction reactions.

UNIT-V

(h) Electron displacement effects: Inductive, inductometric, electromeric, mesomeric, resonance, hyperconjugation and steric effects.

(i) Stereochemistry: Optical isomerism and Geometrical isomerism - chirality - optical isomerism of lactic and tartaric acid - Racemisation - Resolution - asymmetric synthesis - Walden inversion - cis and trans isomerism of maleic and fumaric acids - R-S-Notations - conformational analysis of cyclohexane.

UNIT-VI

(j) Carbohydrates: Classification, sources, preparation and reactions - Glucose, Fructose, Sucrose and lactose- structure of glucose and fructose.

(k) Amino acids: Classification - Zwitter ion - peptide linkage - structure of proteins - structure and functions of DNA and RNA.

(l) Hormones and vitamins: Classifications, sources and functions.

UNIT-VII

(m) Pharmaceutical Chemistry: Terminology - pharmacology, pharmacotherapies, toxicology, chemotherapy, classification and nomenclature of drugs, sources of drugs, Assay of drugs by biological, chemical and immunological methods, physiological effects of functional groups of drugs - Different types of drugs like analgesics, antibiotics, antiseptics, disinfectants, anaesthetics, antacids, antimalarial, antidepressants, antipsychotic and sedatives.

UNIT-VIII

(n) Introduction to IP, BP, USP, NFI, and Extra pharmacopoeia. Brief Study on GMP, GLP, USFDA Guidelines, ICH Guidelines, WHO Guidelines.