

Syllabus for the CBT Exam of Pharmacist (Pharmacy Officer) to be conducted by HPRCA

1. SUBJECTS AS PER ESSENTIAL QUALIFICATION:

A. Pharmaceutical Chemistry: Errors, Sources of errors, types of errors, methods of minimizing errors, accuracy, precision and significant figures, Pharmacopoeia (IP, BP, USP, NF and Extra Pharmacopoeia), Sources and types of impurities, principle involved in the limit test for Chloride, Sulphate, Iron, Arsenic, Lead and Heavy metals, Acid base titration- classification of Acid base titration with examples, Theories of acid base titrations, indicators, Non aqueous titration- Solvents, acidimetry and alkalimetry titration, Precipitation titrations- Mohr's method, Volhard's, Modified Volhard's, Fajans method, Complexometric titration-Classification, metal ion indicators, masking and demasking reagents, Gravimetry- Principle and steps involved in gravimetric analysis, Co-precipitation and post precipitation, Redox titrations-Oxidation and reduction, Types, Principles and applications.

Pharmaceutical formulations, market preparations, storage conditions and uses of following categories: Dental products- Dentifrices, role of fluoride in the treatment of dental caries, Desensitizing agents, Calcium carbonate, Sodium fluoride and Zinc eugenol cement, Haematinics- Ferrous sulphate, Ferrous fumarate, Ferric ammonium citrate, Ferrous ascorbate, Carbonyl iron, Gastro-intestinal Agents- Antacids, Aluminium hydroxide gel, Magnesium hydroxide, Magaldrate, Sodium bicarbonate, Calcium Carbonate, Combinations of antacids, Acidifying agents, Adsorbents, Protectives, Cathartics, Topical agents- Mechanism, classification, Silver Nitrate, Ionic Silver, Chlorhexidine Gluconate, Potassium permanganate, Boric acid, Hydrogen peroxide, Iodine and its preparations, Medicinal gases- Carbon dioxide, nitrous oxide, oxygen.

Heterocyclic chemistry- Nomenclature and classification.

Classification, IUPAC nomenclature, Chemical structure, mechanism of action, medicinal uses, stability, storage conditions and popular brand names of following classes of drugs: Anaesthetics- Local and General, Sedatives and Hypnotics, Antipsychotics, Anticonvulsants, Anti-Depressants, Sympathomimetic Agents, Adrenergic Antagonists- Alpha Adrenergic Blockers, Beta Adrenergic Blockers, Cholinergic Drugs and Related Agents, Cholinergic Blocking Agents- Natural and synthetic, Anti-Arrhythmic Drugs, Anti-Hypertensive Agents, Antianginal Agents, Diuretics, Hypoglycemic Agents, Narcotic and non-narcotic analgesics, Anti-Inflammatory and Nonsteroidal Anti-Inflammatory Agents (NSAIDs), Antibiotics, Antifungals, Anti-tubercular Agents, Urinary tract anti-infective agents, Antiviral agents, Sulphonamides,

Antimalarials, Anti-protozoal Agents, Anti-Neoplastic Agents, Antihistaminic agents, Antidiabetic agents, Gastric Proton pump inhibitors, Drugs acting on Endocrine system.

B. Biochemistry: Cell- Structure and Organization

Biological oxidation- Electron transport chain and its mechanism, Oxidative phosphorylation and its mechanism, Inhibitors of ETC and oxidative phosphorylation.

Carbohydrates- Structure & Classifications, Glycolysis- Pathway, energetics and significance, Citric acid cycle- Pathway, energetics and significance, Pathophysiology of major diseases related to metabolism of carbohydrates, Lipids- Structure & Classification, metabolism, β -Oxidation of saturated fatty acid, ketogenesis, ketolysis & ketoacidosis, Fatty liver, Hypercholesterolemia, atherosclerosis and obesity, Proteins- Structure & Classification, Metabolism of Amino acids, General reactions of amino acids and its significance Transamination, deamination, Urea cycle and decarboxylation. Diseases related to abnormal metabolism of amino acids, Disorders of ammonia metabolism, Phenylketonuria, Albinism, Alkaptonuria, Hyperbilirubinemia and Jaundice, Enzymes- IUB and MB classification, Factors affecting enzyme activity, Mechanism of action of enzymes, Enzyme inhibitors with examples, Therapeutic and diagnostic applications of enzymes and isoenzymes, Nucleic acids- Structure & Classification, Biosynthesis of purine and pyrimidine nucleotides, Components of nucleosides and nucleotides with examples, Structure of DNA, RNA and their functions, Vitamins- Classification with examples, Sources, chemical nature, functions, Coenzyme- Structure and biochemical functions, recommended dietary requirements, deficiency diseases of fat-and water-soluble vitamins.

Qualitative tests and functions of Carbohydrates, Lipids, and Proteins.

C. Pharmacotherapeutics Pathophysiology:

Pharmacotherapeutics- General introduction, Essential Medicines List, Standard Treatment Guidelines

Definition, etiopathogenesis, clinical manifestations, non-pharmacological and pharmacological management of following diseases- Hypertension, Angina and Myocardial infarction, Hyperlipidaemia, Congestive Heart Failure, Asthma, COPD, Diabetes, Thyroid disorders, Epilepsy, Parkinson's disease, Alzheimer's disease, Stroke, Migraine, Gastro oesophageal reflux disease, Peptic Ulcer Disease, Alcoholic liver disease, Inflammatory Bowel Diseases, Iron deficiency anaemia, Megaloblastic anaemia, Tuberculosis, Pneumonia, Urinary tract infections, Hepatitis, Gonorrhoea and Syphilis, Malaria, Viral Infections, HIV and Opportunistic infections, Rheumatoid arthritis, Osteoarthritis, Psoriasis, Scabies, Eczema, Depression, Anxiety, Psychosis, Conjunctivitis, Glaucoma, Polycystic Ovary Syndrome, Dysmenorrhea, Premenstrual Syndrome.

D. Human Anatomy & Physiology: General aspect of Anatomy and physiology- various terminologies, Cellular level of organization, Tissue level of organization.

Gross morphology, Anatomy and Physiology of various organs of the human body: Osseous system, Haemopoietic system, Lymphatic system, Cardiovascular system, Respiratory system, Digestive system, Skeletal muscles, Nervous system, Sense organs, Urinary system, Endocrine system, Reproductive system Haematological Diseases.

E. Pharmacology: General Pharmacology.

Various routes of drug administration, ADME and factors affecting ADME, Bioavailability & Biotransformation- factors affecting, routes of drug excretion, Pharmacodynamics- General mechanisms of drug action and factors modifying drug action

Pharmacology of following drugs categories: Drugs Acting on the Peripheral Nervous System-Cholinergic drugs, Anti-Cholinergic drugs, Adrenergic drugs, Anti-adrenergic drugs, Neuromuscular blocking agents, Drugs used in Myasthenia gravis, Local anaesthetic agents, Non-Steroidal Anti-Inflammatory drugs (NSAIDs), Drugs Acting on the Eye, Pharmacology of drugs acting on the Central Nervous System-General anaesthetics, Hypnotics and sedatives, Anti-Convulsant drugs, Anti-anxiety drugs, Anti-depressant drugs, Anti-psychotics, Nootropic agents, Pharmacology of drugs acting Centrally- Muscle relaxants, Opioid analgesics, Pharmacology of drugs acting on cardiovascular system-Anti-anginal, Anti-hypertensive drugs, Anti-arrhythmic drugs, Drugs used in atherosclerosis and Congestive heart failure, Drug therapy for shock, Pharmacology of Drugs Acting on the Kidney- Diuretics, Anti-Diuretics, Pharmacology of Drugs acting on Gastro Intestinal Tract- Anti-ulcer drugs, Anti-emetics, Laxatives and purgatives, Anti-diarrheal drugs, Pharmacology of Drugs acting on Blood and Blood Forming Organs-Hematinic agents, Anti-coagulants, Anti-platelet agents, Thrombolytic drugs, Pharmacology of Drugs acting on Respiratory Tract- Bronchodilators, Expectorants, Anti-tussive agents, Mucolytic agents, Pharmacology of Chemotherapeutic Agents- Penicillins, Cephalosporins, Aminoglycosides, Fluoroquinolones, Macrolides, Tetracyclines, Sulphonamides, Anti-tubercular drugs, Anti-fungal drugs, Anti-viral drugs, Anti-amoebic agents, Anthelmintics, Anti-malarial agents, Anti-neoplastic agents, UTIs, Biological agents Autocoids- Antihistaminic drugs.

Hormones and Hormone Antagonists- Thyroid & Anti-thyroid drugs, insulin & Oral hypoglycemic agents, Sex hormones, Oral contraceptives, Corticosteroids.

F. Pharmaceutics: Dosage forms- Introduction, definitions and classification, Prescription- Definition, Parts of prescription, handling of Prescription and Errors in prescription.

Packaging materials, Pharmaceutical aids, Preservatives, Unit Operations-Size reduction, Size separation, mixing, filtration, Evaporation, drying, extraction, Distillation, Centrifugation Manufacturing techniques of Pharmaceutical Dosage forms: Tablets, Capsules, Liquid dosage forms, Topical preparations, Nasal preparations, Ear preparations, Powders, granules, Sterile formulations, Immunological products, Quality Assurance and Quality Control, Good Laboratory Practices, Current good manufacturing practice, Pilot plant and scale up techniques of pharmaceutical dosage forms, Calibration and Validation, Regulatory requirements for drug approval.

G. Pharmacognosy: Definition, history, present status and scope of Pharmacognosy, Classification of drugs- Alphabetical, morphological, taxonomical, chemical, pharmacological, chemo and Sero taxonomical classification, Adulteration of drugs of natural origin, Evaluation by organoleptic, microscopic, physical, chemical and biological methods and properties.

General introduction, composition, chemistry & chemical classes, bio sources, therapeutic uses, commercial application, Identification and Analysis of Phytoconstituents of following classes: Alkaloids, terpenoids, glycosides, volatile oils, tannins and resins.

Study of Biological source, chemical constituents and therapeutic efficacy of the following categories of crude drugs: Laxatives, cardiotonic, Carminatives and G.I. regulators, Astringents, Drugs acting on nervous system, Anti-hypertensive, Anti-tussive, Anti-rheumatics, Anti-tumor, Antidiabetic, Diuretics, Anti-dysenteric, Antiseptics and disinfectants, Antimalarial, Oxytocic, Vitamins, Enzymes, Pharmaceutical Aids.

Plant fibers used as surgical dressings

Pharmacognosy in various systems of medicine-Role of Pharmacognosy in allopathy and traditional systems of medicine namely, Ayurveda, Unani, Siddha, Homeopathy systems of medicine.

Method of preparation of Ayurvedic formulations Role of medicinal and aromatic plants in national economy and their export potential. Introduction to herbal formulations, Herbal-Drug and Herb-Food Interactions, Herbal cosmetics, Nutraceuticals, Herbal excipients.

H. Social Pharmacy: General Introduction- Definition and Scope, Role of Pharmacists in Public Health, Concept of health and disease, Social and health education, Hygiene and health, Effect of Environment on Health, Psychosocial Pharmacy, Nutrition- Macronutrients and Micronutrients, Balanced diet, Malnutrition, nutrition deficiency diseases, ill effects of junk foods, calorific and nutritive values of various foods, Dietary supplements, nutraceuticals
Epidemiology-Introduction & its applications. **Definitions-** epidemic, pandemic,

endemic, mode of transmission, outbreak, quarantine, isolation, incubation period, contact tracing, morbidity, mortality.

Causative agents, epidemiology and clinical presentations and Role of Pharmacists in educating the public in prevention of the following communicable diseases: Respiratory infections, Intestinal infections, Arthropod-borne infections, Surface infections, STDs, HIV/AIDS.

National health programs, its objectives, functioning, outcome & role of pharmacists- HIV & AIDS control Programme, TB, Integrated disease surveillance program (IDSP), National leprosy control Programme, National mental health program, National 158 Programme for prevention and control of deafness, Universal immunization Programme, National Programme for control of blindness, Pulse polio Programme.

I. Dispensing Pharmacy/ Hospital & Clinical Pharmacy/

Community Pharmacy: Hospital and its organization, Hospital pharmacy and its organization, Different Committees in the Hospital, Compounding in Hospitals, Drug distribution system in a hospital, Supply Chain and Inventory Control-Preparation of list, drug purchase, inventory management, Education and training program in the hospital.

Radio Pharmaceuticals- Storage, dispensing and disposal of radiopharmaceuticals **Clinical Pharmacy-** Introduction, Concept, functions and responsibilities of clinical pharmacist, Over the counter (OTC) sales, Daily activities of clinical pharmacists, Pharmaceutical care

Clinical laboratory tests, evaluation of disease-significance and interpretation of test results such as, Haematological, cardiac disorders, Fluid and electrolyte balance, Pulmonary Function Tests.

Poisoning- Types, Clinical manifestations and Antidotes Drugs and Poison Information Centre and their services

Pharmacovigilance- Definition, aim and scope

Adverse drug reaction

Medication errors- Definition, types, consequences, and strategies to minimize medication errors, LASA drugs and Tallman lettering as per ISMP.

Community Pharmacy- International and Indian scenarios, Community pharmacists, Good Pharmacy Practice and SOPs, Prescription and prescription handling, Patient counselling, Medication Adherence, Health Screening Services, Community Pharmacy Management.

J. Pharmacy Law & Ethics: General Principles of Law, History and various Acts related to Drugs and Pharmacy profession.

Pharmacy Act-1948 and Rules, Drugs and Cosmetics Act, 1940 & its rules 1945 and New Amendments, Medicinal and Toilet Preparation Act-1955, Poisons Act-1919, Prevention of Cruelty to Animals Act-1960, Drugs and Magic Remedies (Objectionable Advertisements) Act 1954, Narcotic Drugs and

Psychotropic Substances Act 1985 and Rules, Pharmaceutical Legislations, Code of Pharmaceutical ethics, Medical Termination of Pregnancy Act, Right to Information Act, Introduction to Intellectual Property Rights (IPR), Role of all the government pharma regulator bodies- Central Drugs Standards Control Organization (CDSCO), Indian Pharmacopoeia Commission (IPC)

Good Regulatory practices, Introduction to BCS system of classification, Basic concepts of Clinical Trials, ANDA, NDA, New Drug development, New Drugs and Clinical Trials Rules, 2019. Brand v/s Generic, Trade name concept, Introduction to Patent Law

Blood bank- basic requirements and functions

Clinical Establishment Act and Rules

Biomedical Waste Management Rules 2016

Bioethics- Basic concepts, history and principles. Brief overview of ICMR's National Ethical Guidelines for Biomedical and Health Research

Introduction to the Consumer Protection Act

Medical Devices- Categorization, basic aspects related to manufacture and sale

2. GENERAL AWARENESS

- (a) **General knowledge**: General Knowledge including General knowledge of HP
- (b) **Current Affairs**.
- (c) **Everyday Science**.
- (d) **Logical Reasoning**.
- (e) **Social Science** (10th standard).
- (f) **General English** (10th standard)
- (g) **General Hindi** (10th standard)