



PHARMA OLYMPIAD SYLLABUS FOR PHARM.D

P.R.S. EDUCATIONAL TRUST

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Pharma Olympiad Syllabus for Pharm. D

Human Anatomy and Physiology

Scope of anatomy and physiology, Cell structure & physiology, Elementary tissues of the human body, Osseous system, Endocrine Glands, Haemopoietic System, Reproductive System, Gastrointestinal tract, Respiratory System, Autonomic nervous system, Cardiovascular system, Lymphatic system, Sense organs, Skeletal System, Central Nervous system, Urinary System and Sports physiology.

Pharmaceutics

Introduction to dosage forms, Prescription, Posology, Historical background and development of profession of pharmacy, Development of Indian Pharmacopoeia and introduction to other Pharmacopoeias, Weights and measures, Calculations involving percentage solutions, allegation, proof spirit, isotonic solutions, Powders and Granules, Monophasic dosage forms, Biphasic dosage forms, Suppositories and pessaries, Galenicals, Surgical aids, Incompatibility. Pharmaceutical formulations- Tablets & Capsules, Parenterals & Ophthalmic preparations, Definition and concept of Controlled and novel Drug delivery systems with available examples, viz. Parenteral, trans dermal, buccal, rectal, nasal, implants, ocular.

Medicinal Biochemistry

Introduction to biochemistry, Enzymes, Carbohydrate metabolism, Lipid metabolism, Biological oxidation, Protein and amino acid metabolism, Nucleic acid metabolism, Introduction to clinical chemistry, The kidney function tests, Liver function tests, Lipid profile tests, Immunochemical techniques and Electrolytes.

Pharmacology

General Pharmacology, Pharmacology of drugs acting on ANS, Pharmacology of drugs acting on cardiovascular system, Pharmacology of drugs acting on Blood & blood forming agents, renal system, Central Nervous System, Pharmacology of Drugs acting on Respiratory tract, Pharmacology of Hormones and Hormone antagonists, Pharmacology of autotoxins and their antagonists. Chemotherapy, Immunopharmacology, Principles of Animal toxicology, The Gene: Genome structure and function, RNA processing, Altered gene functions, Recombinant DNA technology.

Pharmaceutical Inorganic Chemistry

Errors, Volumetric analysis, Acid-base titrations, Redox titrations, Non-aqueous titrations, Precipitation titrations, Complexometric titrations, Theory of indicators, Gravimetry, Limit tests, Medicinal gases, Acidifiers, Antacids, Cathartics, Electrolyte replenishers, Essential Trace elements, Antimicrobials, Pharmaceutical aids, Dental Products, Miscellaneous compounds, Radio Pharmaceuticals.

Pharmacotherapeutics

Etiopathogenesis and pharmacotherapy of diseases associated with Cardiovascular system, Respiratory system, Gastrointestinal system, Haematological system, Nervous system, Infectious disease, Musculoskeletal disorders, Psychiatry disorders, Renal system, Oncology, Dermatology. General prescribing guidelines for Paediatric & Geriatric patients, Pregnant & breast-feeding women, Ophthalmology, Introduction to rational drug use. Pain management including Pain pathways, neuralgias, headaches, Evidence Based Medicine.

Pharmaceutical Organic Chemistry

Structures and Physical properties, Nomenclature of organic compound belonging to the following classes Alkanes, Alkenes, Dienes, Alkynes, Alcohols, Aldehydes, Ketones, Amides, Amines, Phenols, Alkyl Halides, Carboxylic Acid, Esters, Acid Chlorides And Cycloalkanes. Free radicals chain reactions of alkane, Alicyclic compounds, Nucleophilic aliphatic substitution mechanism, Dehydro halogenation of alkyl halides, Electrophilic and free radicals addition, Carbon-carbon double bond as substituents, Theory of resonance, Electrophilic aromatic substitution, Nucleophilic addition reaction, Mechanism of aldol condensation, claisen condensation, cannizzaro reaction, crossed aldol condensation, crossed cannizzaro reaction, benzoin condensation, perkin condensation. Knoevenagel, Reformatsky reaction, Wittig reaction, Michael addition. Hoffman rearrangement, Nucleophilic aromatic substitution, Oxidation reduction reaction, Study of the following official compounds- preparation, test for purity, assay and medicinal uses of Chlorbutol, Dimercaprol, Glyceryl trinitrate, Urea, Ethylene diamine dihydrate, Vanillin, Paraldehyde, Ethylene chloride, Lactic acid, Tartaric acid, citric acid, salicylic acid, aspirin, methyl salicylate, ethyl benzoate, benzyl benzoate, dimethyl phthalate, sodium lauryl sulphate, saccharin sodium, mephensin.

Hospital Pharmacy

Hospital-its Organisation and functions involving allegation, alcohol dilution, isotonic solution. Hospital pharmacy-Organisation and management. The Budget – Preparation and implementation. Hospital drug policy, Hospital pharmacy services, Manufacture of Pharmaceutical preparations, Continuing professional development programs, Radio Pharmaceuticals – Handling and packaging. Professional Relations and practices of hospital pharmacist.

Pharmaceutical Jurisprudence

Pharmaceutical Legislations, Principle and Significance of professional ethics. Critical study of the code of pharmaceutical ethics drafted by PCI, Drugs and Cosmetics Act, 1940, and its rules 1945, Pharmacy Act –1948, Medicinal and Toilet Preparation Act –1955, Narcotic Drugs and Psychotropic substances Act-1985 and Rules. Study of Salient Features of Drugs and magic remedies Act and its rules, Study of essential Commodities Act Relevant to drugs price control Order, Drug Price control Order & National Drug Policy (Current), Prevention of Cruelty to animals Act-1960, Patents & design Act-1970, Brief study of prescription and Non-prescription Products.

Biostatistics and Research Methodology

Research Methodology- Types of clinical study designs: Case studies, observational studies, interventional studies, Designing the methodology, Sample size determination and Power of a study, Report writing and presentation of data. Biostatistics- Types of data distribution, Measures describing the central tendency distributions- average, median, mode, Measurement of the spread of data-range, variation of mean, standard deviation, variance, coefficient of variation, standard error of mean. Data graphics- Construction and labelling of graphs, histogram, pie-charts, scatter plots, semilogarithmic plots. Basics of testing hypothesis- Null hypothesis, level of significance, power of test, P value, statistical estimation of confidence intervals, Level of significance (Parametric data)- students t test (paired and unpaired), chi Square test, Analysis of Variance (one-way and two-way), Level of significance (Non-parametric data)- Sign test, Wilcoxon's signed rank test, Wilcoxon rank sum test, Mann Whitney U test, Kruskal-Wallis test (one way ANOVA), Linear regression and correlation- Introduction, Pearson's and Spearman's correlation and correlation co-efficient. Introduction to statistical software: SPSS, Epi Info, SAS. Statistical methods in epidemiology. Computer applications in pharmacy.

Clinical Toxicology

General principles involved in the management of poisoning, Antidotes and the clinical applications. Supportive care in clinical Toxicology, Gut Decontamination, Elimination Enhancement, Toxicokinetics. Clinical symptoms and management of acute poisoning with the following agents- Pesticide poisoning: organophosphorous compounds, carbamates, organochlorines, pyrethroids, Opiates overdose, Antidepressants, Barbiturates and benzodiazepines, Alcohol: ethanol, methanol, Paracetamol and salicylates, Non-steroidal anti-inflammatory drugs. Hydrocarbons: Petroleum products and PEG, Caustics: inorganic acids and alkali, Radiation poisoning. Clinical symptoms and management of chronic poisoning with the following agents – Heavy metals: Arsenic, lead, mercury, iron, copper. Venomous snake bites: Families of venomous snakes, clinical effects of venoms, general management as first aid, early manifestations, complications and snake bite injuries. Plants poisoning- Mushrooms, Mycotoxins. Food poisonings. Envenomations – Arthropod bites and stings. Signs and symptoms of substance abuse and treatment of dependence- CNS stimulants: amphetamine, Opioids, CNS depressants, Hallucinogens: LSD, Cannabis group and Tobacco.

Pharmacoepidemiology and Pharmacoeconomics

Pharmacoepidemiology- Origin and evaluation of pharmacoepidemiology need for pharmacoepidemiology, aims and applications. Measurement of outcomes in pharmacoepidemiology, Concept of risk in pharmacoepidemiology, Pharmacoepidemiological methods, Sources of data for pharmacoepidemiological studies, Selected special applications of pharmacoepidemiology. Pharmacoeconomics: Role in formulary management decisions, Pharmacoeconomic evaluation, Applications of Pharmacoeconomics- Software and case studies.

Pharmacognosy

Definition, history and scope of Pharmacognosy, Cultivation, collection, processing and storage of crude drugs, Detailed method of cultivation of crude drugs, Microscopical and powder Microscopical study of crude drugs, Study of natural pesticides, Detailed study of various cell constituents, Carbohydrates and related products, Definition sources, method extraction, chemistry and method of analysis of lipids, Definition, classification, chemistry and method of analysis of protein, Study of plants fibers used in surgical dressings and related products, Different methods of adulteration of crude drugs.

Pharmaceutical Analysis

Quality Assurance- Introduction, sources of quality variation, control of quality variation, Concept of statistical quality control, Validation methods- quality of equipment, validation of equipment and validation of analytical instruments and calibration, GLP, ISO 9000, Total quality management, quality review and documentation, ICH-guidelines, Regulatory control. Chromatography, Electrometric Methods- Potentiometry, Conductometry, Polarography, Amperometric Titrations. Spectroscopy- Absorption Spectroscopy, Flame Photometry, Atomic Absorption Spectrometry, Atomic Emission Spectroscopy, Introduction on NMR & ESR, Mass spectroscopy, Polarimetry, X-RAY Diffraction and Thermal Analysis.

Clinical Pharmacy

Definitions, development and scope of clinical pharmacy, Introduction to daily activities of a clinical pharmacist- Drug therapy monitoring (medication chart review, clinical review, pharmacist interventions), Ward round participation, Adverse drug reaction management, Drug information and poisons information, Medication history, Patient counselling, Drug utilisation evaluation (DUE) and review (DUR). Quality assurance of clinical pharmacy services. Patient data analysis, Clinical laboratory tests used in the evaluation of disease states, and interpretation of test results- Haematological, Liver function, Renal function, thyroid function tests, Tests associated with cardiac disorders, Fluid and electrolyte balance, Microbiological culture sensitivity tests, Pulmonary Function Tests. Drug & Poison information, Pharmacovigilance, Communication skills, including patient counselling techniques, medication history interview, presentation of cases. Pharmaceutical care concepts, Critical evaluation of biomedical literature. Medication errors.

Biopharmaceutics, Pharmacokinetics, Clinical Pharmacokinetics and Pharmacotherapeutic drug monitoring

Bio-pharmaceutics including drug absorption and factors affecting drug absorption, Drug distribution and Elimination. Pharmacokinetics- Introduction to Pharmacokinetics, One compartment open model, Multicompartment models, Multiple – Dosage Regimens, Nonlinear Pharmacokinetics, Noncompartmental Pharmacokinetics, Bioavailability and Bioequivalence. Introduction to Clinical pharmacokinetics, Design of dosage regimens, Pharmacokinetics of Drug Interaction, Therapeutic Drug monitoring, Dosage adjustment in Renal and hepatic Disease, Population Pharmacokinetics and Pharmacogenetics.

Clinical Research

Introduction to Drug development process, Various Approaches to drug discovery- Pharmacological, Toxicological, IND Application, Drug characterization, Dosage form. Clinical development of drug- Introduction to Clinical trials, Various phases of clinical trial. Methods of post marketing surveillance, Abbreviated New Drug Application submission, Good Clinical Practice – ICH, GCP, Central drug standard control organisation (CDSCO) guidelines. Challenges in the implementation of guidelines. Ethical guidelines in Clinical Research, Composition, responsibilities, procedures of IRB / IEC, Overview of regulatory environment in USA, Europe and India, Role and responsibilities of clinical trial personnel as per ICH GCP. Designing of clinical study documents (protocol, CRF, ICF, PIC with assignment). Informed consent Process, Data management and its components. Safety monitoring in clinical trials.

Medicinal Chemistry

Modern concept of rational drug design, A study of the development of the following classes of drugs including SAR, mechanism of action, synthesis of important compounds, chemical nomenclature, brand names of important marketed products and their side effects- Anti-infective agents, Sulphonamides and sulphones, Antimalarials, Antibiotics, Antineoplastic agents, Cardiovascular agents, Hypoglycaemic agents, Thyroid and Antithyroid agents, Diuretics, Diagnostic agents, Steroidal Hormones and Adrenocorticoids.

Pathophysiology

Basic principles of cell injury and adaptation, Neoplastic diseases, Pathophysiology of common diseases, Diseases of Immunity, Basic mechanisms of inflammation and repair. Cancer, Types of shock, mechanisms, stages and management, Biological effects of radiation, Environmental and nutritional diseases, Pathophysiology of common diseases- Parkinsonism, Schizophrenia, Depression and mania, Hypertension, Stroke (ischaemic and haemorrhage), Angina, CCF, Atherosclerosis, Myocardial infarction, Diabetes Mellitus, Peptic ulcer and inflammatory bowel diseases, Cirrhosis and Alcoholic liver diseases, Acute and chronic renal failure, Asthma and chronic obstructive airway diseases, Infectious diseases.

Microbiology

Introduction to Microbiology, Microscopy and staining technique, Biology of Microorganisms, Microbial spoilage, Immunology, Fungi and Viruses, Aseptic Technique, Sterilization & Disinfection, Diagnostic tests: Schick's Test, Elisa test, Western Blot test, Southern Blot PCR, Widal, QBC, Mantoux, Peripheral smear. Study of malarial parasite. Microbial Assay. Microbial culture sensitivity Testing: Interpretation of results Principles and methods of different microbiological assays, microbiological assay of Penicillin, Streptomycin and vitamin B2 and B12. Standardisation of vaccines and sera, Study of infectious diseases: Typhoid, Tuberculosis, Malaria, Cholera, Hepatitis, Meningitis, Syphilis & Gonorrhoea and HIV.