

गुरुकुल कांगड़ी प्रवेश परीक्षा हेतु पाठ्यक्रम

SYLLABI FOR GURUKULA KANGRI ENTRANCE TEST (GKET) 2022

COURSES

- M.Sc.
(Maths/Physics/Chemistry/Microbiology/Environmental Sc.)
- M.C.A.
- M.Pharma.
- B.Pharma.
- B.Pharma. II yr (Lateral Entry)
- D.Pharma.
- Master of Physical Education (M.P.Ed.)
- Bachelor of Physical Education (B.P.Ed.)



गुरुकुल कांगड़ी (समविश्वविद्यालय) हरिद्वार

(यू.जी.सी. एक्ट 1956 के सैक्शन-3 के अन्तर्गत समविश्वविद्यालय)

GURUKULA KANGRI (DEEMED TO BE UNIVERSITY) HARIDWAR

(Deemed to be University u/s 3 of UGC Act 1956)

www.gkv.ac.in

SYLLABI FOR ENTRANCE EXAMINATION

**M.Sc. (Mathematics/Physics/ Chemistry/Microbiology/Environmental Science) /
M.C.A./ M.Pharma./B.Pharma./D.Pharma.**

The entrance examination paper of each subject/course shall consist of 100 objective type questions. The candidate shall be required to attempt all the questions. The syllabus for entrance exam for each subject/course along with distribution of marks, wherever applicable, is as follows:

M.A./M.Sc. Mathematics

(Special emphasis on Industrial Mathematics)

REAL ANALYSIS

15 Marks

Sequence and series of real numbers, continuous function and differentiability of real valued function, R-integrability, compactness and connectedness, Fourier series.

DIFFERENTIAL CALCULUS

10 Marks

Partial Differential, Maxima and Minima of function of one and two variables.

INTEGRAL CALCULUS

30 Marks

Integration, Definite integrals. Differential Equations: Differential equations of first order, linear differential equations of higher order with constant coefficients.

ALGEBRA

25 Marks

Groups, Rings, Fields and vector spaces. Algebra of matrix, Rank and inverse of a matrix consistency and solution of system of linear equations, Eigen values and Eigenvectors.

3-D (SOLID GEOMETRY)

10 Marks

Plane and Straight line.

GENERAL AWARENESS & LOGIC ABILITY

10 Marks

M.Sc. Physics

MECHANICS & WAVE PHENOMENA

15 Marks

Multiplication and differentiation of vectors, gradient, divergence and curl of a vector, Gauss and Stoke's theorems, Centre of mass, Work and energy, Conservative and non Conservative forces. Law of conservation of energy, Motion in central field, Two particle central force problem and reduced mass, Compound pendulum, Linear and angular momenta, Torque and angular momentum. Moment of inertia. Calculation of M.I. of some simple objects, Flywheel.

Elastic constants, Torsion of cylinder, Bending beam, Cantilevers, Viscosity, Poiseuille's formula, Stoke's law.

S.H.M., Differential equation of wave motion, Lissajous figures, Damped and forced oscillations. Fourier analysis.

OPTICS

15 Marks

Fermat's principle, Cardinal points, Aberrations, Eyepieces. Interference, Fresnel's biprism, Interference in thin film, Newton's rings, Michelson Interferometer. Diffractions,

Simple theory of Fresnel diffraction with applications. Fraunhofer diffraction- single slit, double slit, plan diffraction grating.

Resolution, Rayleigh criteria, Resolving power of prism, Grating and telescope.

Polarisation, Malus law, Brewster's law, Double refraction, Nicol prism, Production and detection of plane, Circular and elliptically polarised light. Optical rotation.

THERMODYNAMICS

15 Marks

Kinetic theory of gases, Maxwell's distribution law, Specific heat, Mean free path, Vander-waal's equation, Critical constants, 1st law of thermodynamics, Isothermal and adiabatic processes, Reversible and irreversible processes, Carnot's engine and Carnot's theorem, Absolute scale of temperature, Second law of thermodynamics, Identity of perfect gas scale and absolute scale, Entropy, Clausius-Clayperon's heat equation, Joule-Thomson effect, Maxwell's thermodynamical relations, Conductivity, Radiation, Kirchhoff's law, Stefan-Boltzmann law, Energy distribution in the spectrum of black body.

ELECTRICITY AND MAGNETISM

15 Marks

Gauss theorem and its applications, Electric field and electric potential, Electric polarisation of matter, Polarisation and displacement vectors, Dielectrics, Kirchhoff's laws and their applications, Biot-Savart law and its applications, Electromagnetic induction, Faraday's law, Ballistic galvanometer, Growth and decay of currents, A.C. circuits, Transformer, Network theorems and a.c. bridges, Magnetic permeability and susceptibility, Dia, para and ferromagnetism, Measurement of susceptibility, Hysteresis loop.

QUANTUM MECHANICS

5 Marks

Black body radiation, Planck's theory, photoelectric effect, Compton effect, Frank-Hertz experiment, Uncertainty principle, Wave particle duality, deBroglie theory, Davission-Germer experiment, Schroedinger equation with application to simple potential problems.

ATOMIC PHYSICS

5 Marks

Bohr, Sommerfield and vector atom model, Electron spin, Pauli exclusion principle, Normal Zeeman effect, Stern-Garlach experiment, Various coupling schemes.

NUCLEAR PHYSICS

5 Marks

Binding energy, Nuclear forces, Nuclear spin, Magnetic moment, Liquid drop and shell models, Fission and fusion, Radioactivity.

PERIODIC SOLIDS

5 Marks

Space lattice, Unit cell, Miller indices, sc, bcc and fcc lattices, CsCl and NaCl structure, Bragg's law, X-ray diffraction.

RELATIVITY**5 Marks**

Special theory of relativity, Galilean invariance, Michelson-Morley experiment, Lorentz transformation, Relativistic-addition of velocities, Mass variation with velocity, Mass energy equivalence.

ELECTRONICS**15 Marks**

Thermionic emission, Vacuum diode, triode, tetrode and pentode, Intrinsic and extrinsic semiconductors, PN junction, Half wave and full wave rectification, Filter circuits, Zener diode, Voltage stabilization, Bipolar Junction Transistor, Transistor biasing, Transistor configurations: CE, CB and CC transistor amplifiers.

M.Sc. Chemistry

(Specialization in Commercial Methods of Chemical Analysis)

PART - A**25 Marks**

g-atom, g-ion, mole and equivalents, oxidation reduction, oxidation number, Numerical problems.

Expressing the concentrations in molarity, normality, molality, formality, m.eq./ml, percentage (W/W, V/V and W/V), p.p.m., mole fraction. Strength of H_2O_2 solutions and oleum, Numerical problems. Problems based on chemical equations. Theory of acid-base, redox, iodometric, iodimetric and complexometric titrations, numerical problems. Qualitative analysis of cations and anions. Lassaigne's solution, test for N, S, halogens and different functional groups in an organic compound, Determination of iodine value and saponification value of the oil and fat.

PART - B**25 Marks****Atomic Structure**

Bohr's theory of hydrogen atom, wave-particle duality, Heisenberg's uncertainty principle, wave function, Schrodinger's wave equation, Quantum numbers.

Periodicity in Properties

Electronic configuration, atomic size, ionization energy, electron affinity, electronegativity polarizing power, metallic character.

Chemical Bonding

Ionic bond, energetics of properties and structures, covalent bond - valence bond and molecular orbital approach for diatomic molecules, hybridization involving s, p and d orbitals shapes of molecules, resonance.

Coordinate Bond

Coordination compounds, nomenclature, isomerism Werner's theory.

Organometallic compounds Sn, Pb, Hg and their uses silicates and silicones and their uses, paints, pigments and cement, Fertilizers, Radioactivity and its applications, carbon dating Age of the earth, numerical problems.

PART - C**25 Marks****Ionic equilibrium**

Ostwald's dilution law, concepts of acids and bases, p^H Buffers, solubility and solubility products, salt hydrolysis, Numericals.

Distribution Law

Partition coefficient, Distribution of solute undergoing dissociation/association in a given solvent, solvent extraction, Numericals.

Chemical Kinetics

Rates of reaction, rate constant, molecularity & order of reaction, pseudo-order reactions, Zero, first and second order reactions, factors influencing rates, rate constant and the order of reaction, Effect of temperature, activation energy, preexponential factor, Numericals.

Electrochemical Cells

Galvanic cell, Nernst's theory and equation for single electrode potential, cell potential, Reference electrodes (NHE, Calomel, and Standard silver electrode), p^H electrodes (HE, glass and quinhydrone electrode), Determination of p^H , solubility and transition temperature from Galvanic cell. Electrolysis Conductance cell, conductivity, equivalent conductance, molar conductance. Kohlrausch's law and its applications, Numericals.

Photochemistry pH

Grotthus-Draper law, Plank's law, Beer-Lambert law, Einstein-Stark's law, Quantum yield and its determination.

PART - D**25 Marks****Composition of Organic Compounds**

Qualitative and quantitative methods of analysis of C.H.N.S. and halogen, molecular weight, molecular formula, tests for functional groups and identification.

Nomenclature of Organic Compounds

IUPAC names of hydrocarbons, heterocycles, containing one hetero atom organic compounds containing one or more functional groups and identification.

Stereochemistry of Carbon Compounds

Optical and geometrical isomers (including simple cyclic system), Fischer projection, enantiomers, diastereomers, meso form and their properties, R, S nomenclature, Z, E nomenclature.

Electronic effects and Reactive Intermediates

Inductive electromeric and conjugative effects, resonance, effect on acid base strength, cleavage of bond carbocation, carbonion and free radical, Reaction mechanism free radical, nucleophilic, electrophilic substitutions and additions.

Preparation and Reactions

(Involving introduction and interconversion of functional

groups ascending and descending a series, substitution eliminational additional and rearrangements) Hydrocarbons, alkylhalids, alcohols, carbonyl compounds, corboxylic acids (and their derivatives) amines (and their derivatives), active methylene compounds, Aromatic hydrocarbons, halides, nitro compounds ,amino compounds, diazonium salts, phenols, carbonyl compound carboboxylic and sulphonic acids and derivatives with emphasis on important name reactions. Carbohydrates, structure of Glucose, Fructose, Sucrose, Starch and cellulose, amino acids and proteins, Nucleic acids and enzymes.

M.Sc. Microbiology

Cell Biology

Structure of prokaryotic and eukaryotic cell, compartmentalization of cell organelles, membrane structure and function, fluid mosaic model of membrane, properties and functions of membranes, structural organization and function of cell organelles, ultrastructure of nucleus, mitochondria, Golgi bodies, lysosomes, endoplasmic reticulum, peroxisomes, plastids, vacuoles, chloroplast. Genome organization, Structure of chromosomes, chromatin (heterochromatin, euchromatin) and chromosomes, DNA & RNA and their replication.

10 Marks

Plant Physiology

Absorption of Water, Transpiration, Asent of sap, Photosynthesis, light harvesting complexes, photophosphorylation, CO₂ fixation-C₃, C₄ and CAM pathways, respiration, mechanism of aerobic and anaerobic respiration, nitrogen metabolism, biological nitrogen fixation, genetics of nitrogen fixation, nif genes, nod genes, Photoperiodism.

10 Marks

Inheritance Biology

Mendels laws of inheritance: law of dominance, law of segregation, gene integrations, epistasis, hypostans, genetic recombination in prokaryotes and eukaryotes, mutations- types of mutation, spontaneous and induced, radiation as mutagen, chemical mutagens, uses of mutagen in plant breeding, polyploidy, evolution of polyploids.

10 Marks

History, development of Microbiology and Microbial diversity

Contributions made by scientists in different areas of microbiology- Anton Van Leeuwenhoek, Louis Pasteur, Robert Koch, Edward Jenner, Alexander Flemming, Golden era of microbiology.

Distribution of eukaryotic and prokaryotic microorganisms and their characteristic features of Protozoa, Fungi, Bacteria, Archaeobacteria, Cyanobacteria, Actinomycetes and Role of microorganisms in human welfare.

10 Marks

Food Microbiology

Microorganism associated with food, microbial food and feed, methods of food preservation, fermented food, oriental food (tempeh, miso, soyu), microbial spoilage of food, bacterial toxins (endo and exo toxins), mycotoxins, health hazards of mycotoxins, flat sour spoilage, Microbes as food (single cell protein, mycoprotein).

10 Marks

Microbial Physiology and Genetics

Photosynthetic bacteria, oxygenic and anoxygenic bacteria, photosynthetic pigments, bacteriorhodopsin, mechanism of photosynthesis, microbial metabolic pathways, mechanism of enzyme action and enzyme kinetics, biological nitrogen fixation, mechanism of nitrogen fixation, nitrogen fixing microorganism, cyanobacterial biofertilizers, bacterial biofertilizers, auxotroph, diploid, prototroph, mutagens, silent mutations, episome, regulon, operon.

10 Marks

Immunology and Medical Microbiology

Types of immunity, types of immune system, structure and functions of antibodies, antibody generation, antibody diversity, antigen-antibody interaction, monoclonal antibodies, major histocompatibility complex (structure and function), serological tests, haemagglutination, widal test, Schick test. Microbes involved in certain human diseases such as typhoid fever, tetanus, rabies, hepatitis, candidiasis etc, disease control methods- chemotherapy, gene therapy, vaccination, vaccines and its types, DNA vaccine, genetically engineered vaccines, interferons, insulin, somatostatin etc.

10 Marks

Microbial Fermentation

Designing of fermentor, aseptic operation, batch, fed batch and continuous cultures, homofermentative microorganisms and heterofermentative microorganisms, production of ethanol, alcoholic beverages, enzymes and antibiotics.

10 Marks

Soil, Agricultural and Environmental Microbiology

Soil as a culture media for proliferation of heterogeneous group of microorganism, Rhizosphere and phylloplane microflora, types of mycorrhizae, mycorrhizal fungi, benefits from mycorrhizal fungi in forestry and agriculture, microorganisms used in biofertilizers, techniques used in isolation of soil microflora for their quantitative and qualitative enumeration.

Methods for estimation of soil microflora, microbial interactions, mutualism, synergism, antagonism, microbial degradation of wood, air borne microflora and its impact on human health, microbial assessment of water quality, biofuel, microbial bioremediation of hydrocarbons and pesticides.

10 Marks

Molecular Biology and Recombinant DNA Technology

Organization of nucleic acids (DNA and RNA) in virus, prokaryotic and eukaryotic microorganisms, types of DNA polymerases and RNA polymerases, DNA damage and repair systems, gene expression, post transcriptional processing, gene regulation, restriction enzymes, cloning vectors, methods of gene manipulation, genomics, proteomics, metagenomics.

10 Marks

M.Sc. Environmental Science/Env. Technology

Parasitic protozoans Amoeba, Plasmodium, Leishmania, Trypanosoma and disease caused by them (Amoebiasis, Malaria, Leishmaniasis and Trypanosomiasis) and diseases caused by Helminthes (Taeniasis, Ascariasis, Fascioliasis).

10 Marks

Economic Zoology: Sericulture, Apiculture, Lac-culture, Fish culture. Theories of organic evolution (Lamarckism, Neolamarckism, Darwinism, Neo-darwinism).

10 Marks

Elementary knowledge of structure of cell and functions of Mitochondria, Golgi complex, Lysosome, Ribosome, Endoplasmic reticulum and Nucleus.

10 Marks

Definition of Ecology, History of Ecology, Relationship of ecology with other sciences, Climatic factors, Light, Temperature, Water, Humidity, Soil, pH and nutrients.

10 Marks

Types of ecosystem, Structure and functions of ecosystem, Energy flow in ecosystem, Forest ecosystem, Fresh water, Marine ecosystem and Desert ecosystem.

10 Marks

Renewable and Nonrenewable resources of energy, Elementary knowledge of forest, water, and solar energy, petroleum, coal, and natural gases.

10 Marks

Biogeochemical Cycles: carbon cycle, oxygen cycle, hydrogen cycle, nitrogen cycle, phosphorus cycle, Population and its characteristics (spacing, density, growth, natality, mortality), Regulation of population size by density dependent and density independent factors.

10 Marks

Wildlife in India, Endangered fauna and flora, Wildlife conservation in India, National Parks and Sanctuaries and Biosphere Reserve. Biodiversity value, Threat to Biodiversity and conservation methods.

10 Marks

Structure and composition of atmosphere, Hydrosphere, Lithosphere and Biosphere. Ecological adaptation, Hydrophytes, Mesophytes, Xerophytes, Cursorial adaptations, Desert adaptations. Aquatic and Aerial adaptations.

10 Marks

Air pollution, Water pollution, Noise pollution (Basic Knowledge) and Sources of air, Water and noise pollution and their control measures.

10 Marks

M.C.A. (Master of Computer Applications)

(A) Mathematics & Statistics 70 Marks

Linear Algebra 10 Marks

Solution of simultaneous equations, addition and multiplication of matrices, computation of inverse and rank of matrix, vector spaces sub spaces, bases and dimensions, linear transformation.

Co-ordinate Geometry 10 Marks

Circles, tangent and normal, orthogonal circles, coaxial system of circles, parabola, ellipse and hyperbola, their equations in standard form and simple properties.

Differential and Integral Calculus 10 Marks

Differentiation of algebraic, exponential and logarithmic functions, Application to simple problems of maxima and minima, partial differentiation of the functions of two variables, integration of functions by substitution, partial fractions, integration by parts. Definite integrals and their properties for finding areas, volumes and surfaces of simple curves, simpson's and trapezoidal rules.

Differential and Difference Equations 10 Marks

Linear differential equation of first degree and first order, difference equations of first order.

Vector 10 Marks

Vector product of two vectors, scalar triple product and vector triple product, differentiation and integration of vectors.

Number System 10 Marks

Natural numbers, integers, rational and irrational numbers, complex and real numbers, binary numbers.

Statistics 10 Marks

Theory of probability, Averages dispersion, coefficient of variation, skewness, coefficient of correlation and interpolation, fitting of curves, method of least squares, Binomial, Poisson and normal distribution.

(B) Mental Ability 15 Marks

Series, figure, characters, words etc. matching and sequence completeness, logical functions, truth tables etc.

(C) General Awareness 15 Marks

About current affairs and computers.

M.Pharm. (Pharmacology/Pharmaceutics)

(A) Pharmacology 10 Marks

General Pharmacology, Principles of toxicology, Drugs acting on urinary system Pharmacology of peripheral nervous system Pharmacology of central nervous System Pharmacology of cardiovascular system Immunopharmacology Drugs acting on Respiratory system Pharmacology of Endocrine system Neurohumoral transmission in autonomic and central nervous system Vitamins & Minerals Chemotherapy Autacoids and their Antagonists Pharmacology of drug acting on the gastrointestinal tract Chronopharmacology

(B) Physical Chemistry 10 Marks

Composition & physical states of matter Refractive index Solutions Electrochemistry, Kinetics Colligative Properties Thermodynamics Ionic equilibrium

(C) Physical Pharmacy 10 Marks

Buffer Solubility Matter, properties of matter Viscosity and rheology Surface and interfacial phenomenon Dispersion systems Complexation Micromeritics and powder rheology

(D) Organic Chemistry 10 Marks

General principles Pericyclic reactions Aromaticity & chemistry of aromatic compounds Different classes of compounds Amino acids & proteins Different aromatic classes of compounds Polycyclic aromatic hydrocarbons Stereochemistry Carbohydrates Carbonyl Chemistry Heterocyclic Chemistry Protection & deprotection of groups Bridged rings Kinetic & thermodynamic control

(E) Dispensing and Hospital Pharmacy 10 Marks

Introduction to laboratory equipment, weighing methodology, handling of prescriptions, labelling instructions for dispensed products Posological calculations involved in the calculation of dosage for infants. Study of current patent and proprietary products, generic products and selected brand products, indications, contraindications, adverse drug reactions, available dosage forms and packing Compounding and dispensing of following prescriptions Reading and counselling of prescriptions from the clinical practice Enlarging and reducing formula, displacement value Preparations of formulations involving allegation, alcohol dilution, isotonic solution

(F) Pharmaceutical Chemistry 10 Marks

Pharmaceutical Inorganic Chemistry Dentifrices, desensitizing agents, & anticaries agents Pharmaceutical Impurities Isotopes Monographs Medicinal Chemistry Various classes of therapeutic agents Different classes of therapeutic drugs Therapeutic classes of drugs Different classes of therapeutic drugs

(G) Pharmaceutical Jurisprudence 10 Marks

Narcotic Drugs and Psychotropic Substances Act, and Rules thereunder Factory Act Shops and Establishment Act Introduction to Intellectual Property Rights and Indian Patent

Act 1970 An Introduction to Standard Institutions and Regulatory Authorities such as BIS, ASTM, ISO, TGA, USFDA, MHRA, ICH, WHO Minimum Wages Act 1948 Prevention of Food Adulteration Act 1954 and Rules Industrial Development and Regulation act 1951 Drugs and Magic Remedies (Objectionable Advertisements) Act 1954 Medicinal and Toilet Preparations (Excise Duties) Act 1955, Rules 1976 Historical background Drug legislation in India, Code of Ethics for Pharmacists The Pharmacy Act 1948 Drugs and Cosmetics Act 1940, Rules 1945, including New Drug applications Consumer Protection Act Indian Pharmaceutical Industry- An Overview Medical Termination of Pregnancy Act 1970 and Rules 1975 Prevention of Cruelty to Animals Act 1960 Drug (Price Control) Order

(H) Pharmaceutical Management 10 Marks

Introduction to management Inventory Management Communication Research Management Human resource and development (HRD) Planning and Forecasting Organization World trade organization (WTO) and trade-related intellectual property rights (TRIPS) Standard institutions and regulatory authorities GATT Marketing Research Leadership and motivation

(I) Pharmaceutics 10 Marks

Pharmacy Profession & Introduction to Pharmaceutics Introduction to dosage form Biological products Pharmaceutical Plant, location, layout Ophthalmic preparations Preformulations Packaging Materials Cosmetics Pilot plant scale-up techniques Dosage Form Necessities and Additives Powders Sources of drug information Tablets Parenteral - product requiring sterile packaging Suspensions Emulsions Suppositories Stability of formulated products Prolonged Action Pharmaceuticals Novel Drug delivery system GMP and Validation Semisolids Allopathic dosage form Crude extract Allergenic extract Capsules Liquids (solutions, syrups, elixirs, spirits, aromatic water, liquid for external uses) Pharmaceutical Aerosols

(J) Pharmaceutical Engineering 10 Marks

Material of constructions Drying Size reduction and size separation Extraction Mixing Crystallization Automated process control systems Industrial hazards & safety precautions Evaporation Distillation Fluid flow Heat transfer Filtration and Centrifugation Dehumidification and humidity control Refrigeration and air conditioning

(K) Pharmacognosy 10 Marks

Introductory Pharmacognosy Classification of crude drugs Plant products Principles of plant classification Pharmaceutical aids Animal products Traditional herbal drugs Plants based industries and research institutes in India Patents Ayurvedic system of medicine Homeopathic system of medicine Toxic drugs Enzymes Natural pesticides and insecticides Adulteration and evaluation of crude drugs Quantitative microscopy Factors influencing quality of crude drugs Techniques in microscopy Introduction to phytoconstituents Biogenetic pathways Carbohydrates & lipids Tannins Volatile oils Resinous drugs Glycosides Alkaloids Extraction and Isolation Techniques Phytopharmaceuticals Quality control and Standardization of herbal drugs Herbal formulations Worldwide trade of crude drugs

and volatile oils Herbal cosmetics

(L) Human Anatomy and Physiology 10 Marks

Cell physiology Endocrine Glands Reproductive System Gastrointestinal tract Respiratory System Autonomic nervous system Cardiovascular system Lymphatic system The Blood Sense organs Skeletal System Central Nervous system Urinary System

(M) Pharmaceutical Analysis 10 Marks

Importance of quality control in pharmacy Acid-base titrations Gravimetry Extraction techniques Potentiometry Calibration General principles of spectroscopy Mass spectrometry Polarography Nephelometry & Turbidimetry Ultraviolet-visible Spectrometry Spectrofluorimetry Flame photometry & atomic absorption spectrometry Infrared spectrometry Miscellaneous methods of analysis Non-aqueous titrations Oxidation- reduction titrations Precipitation titrations Complexometric titrations Proton nuclear magnetic resonance spectrometry Chromatography Miscellaneous

(N) Clinical Pharmacy and Therapeutics 10 Marks

Drug information services, Drug interactions Drug interaction in pediatric and geriatric patients, drug treatment during pregnancy, lactation and menstruation Therapeutic drug monitoring, adverse drug reaction (ADR), types of ADR, Mechanism of ADR. Drug interaction, Monitoring and reporting of ADR and its significance Age-related drug therapy: concept of posology, drug therapy for neonates, paediatrics and geriatrics. Drugs used in pregnancy and lactation Drug therapy in gastrointestinal, hepatic, renal, cardiovascular and Respiratory Disorders Pharmacovigilance, Therapeutic drug monitoring, Neutraceuticals, essential drugs and rational drug usage General Principles, preparation, maintenance, analysis of observational records in Clinical Pharmacy Drug therapy in infections of respiratory system, urinary system, infective meningitis, TB, HIV, malaria and filaria Drug therapy for thyroid and parathyroid disorders, diabetes mellitus, menstrual cycle disorders, menopause and male sexual dysfunction Drug therapy for malignant disorders like leukaemia, lymphoma and solid tumours Drug therapy for rheumatic, eye and skin disorders Clinical trials, type and phases of clinical trials, placebo, ethical and regulatory issues including Good clinical practice in clinical trials Drug therapy for neurological and psychological disorders

(O) Biochemistry 10 Marks

Cell Lipids Enzymes Nucleic acids Vitamins Biological oxidations & reductions Carbohydrates Proteins Hereditary diseases

(P) Biopharmaceutics & Pharmacokinetics 10 Marks

Bio-pharmaceutics, Bio-pharmaceutical statistics, Bio-availability & Bio-equivalence

(Q) Biotechnology 10 Marks

Plant Cell and Tissue Culture Fermentation Technology and Industrial Microbiology Recombinant DNA Technology

Process and Applications Animal Cell Culture Biotechnology-Derived Products

(R) Pathophysiology 10 Marks

Basic principles of cell injury and adaptation Neoplastic diseases Pathophysiology of common diseases Laboratory tests for Liver function tests and kidney function tests Immunopathology including amyloidosis Infectious diseases Basic mechanisms of inflammation and repair Disorders of fluid, electrolyte and acid-base balance Disorders of homeostasis: white blood cells, lymphoid tissues, and red blood cells related diseases

(S) Microbiology 10 Marks

Introduction to Microbiology Microscopy and staining technique Biology of Microorganisms Microbial spoilage Vaccines & Sera Fungi and Viruses Aseptic Technique Sterilization & Disinfection Microbial Assay

B.Pharma. 1st Year/D.Pharma.

The entrance examination paper shall have three parts.

PART-A : Chemistry (50 questions of 01 marks each)

PART-B : Biology (50 questions of 01 marks each)

PART-C : Mathematics (50 questions of 01 marks each)

Candidate shall be required to attempt Part-A compulsorily. He will attempt either Part B or Part C. In all, the candidate shall be required to attempt 100 questions. The questions shall be objective type with single answer. The duration of entrance examination shall be 02 hours. Detailed syllabi shall be as follows:

PART-A : CHEMISTRY

UNIT-1 (13 marks)

1. g – atom, g – ion, mol and equivalents, oxidation, reduction, oxidation number, Numerical problems.
2. Expressing the concentrations in molarity, normality, molality, formality, m.eq./ml. percentage (W/W, V/V, W/V), p.p.m., and mole fraction. Strength of H₂O₂ solutions and oleum. Problems based on chemical equations. Acid – Base, redox, iodometric, iodimetric and complexometric titrations. Qualitative analysis of cation and anions. Lassaigne's solution, test for N, S, halogens and different functional groups in an organic compound, Eudiometry.

UNIT-2 (12 marks)

1. Bohr's and Sommerfield's theory of hydrogen atom, Hund's rule, Pauli's exclusion principle, quantum numbers, wave – particle duality, Heisenberg's uncertainty principle, wave function, nodes.
2. Periodicity in Properties, Electronic configuration, atomic size, ionization energy, electron affinity, electronegativity.
3. Ionic bond, Covalent bond, Coordinate bond, metallic bond,

% Ionic character, Fajan rules, Hybridization involving s, p and d orbitals, H-bond, dipole moment, Vander waal Forces, Resonance.

- Coordination compounds, nomenclature, isomerism, Warner's theory. Radioactivity and its applications, carbon dating, Age of the earth.
- Physical and Chemical equilibrium, K_p , K_c , Reaction quotient, Lechatelier's principle. Ionic equilibrium, Ostwald's dilution law, concepts of acids and bases, p^H Buffers, solubility and solubility products, salt hydrolysis, Acid – Base indicators.

UNIT – 3 (13 marks)

- Ideal gas laws and equation, Vander waal equation, Liquefaction of gases.
- Colloids, peptization & properties, Coagulation, protection, Gold no., Gels, Emulsions, Colloidal electrolytes, Micelle, application of colloids. Adsorption and Catalysis.
- Rates of reaction, rate constant, molecularity & order of reaction, pseudo – order reactions, zero & first order reactions. Factors influencing rates, rate constant and the order of reaction. Effect of temperature, activation energy, preexponential factor. Numericals.
- Galvanic cell, Nernst's theory & equation for single electrode potential, cell potential, Reference electrodes (NHE, calomel and standard silver electrode). Determination of p^H , solubility and transition temperature from Galvanic cell, Faraday Laws of electrolysis, Conductance cell, Conductivity, Equivalent conductance. Molar conductance. Kohlrausch's law and its applications.
- Colligative properties, Osmotic pressure, lowering of vapor pressure, Elevation in boiling point, Depression in freezing point, Abnormal molecular weight and colligative properties, Vant hoff factor.
- Basic terms used in thermodynamics, I & II law of thermodynamics, Work, Different type of Heat changes, Hess Law. Application of thermodynamics to biological systems.

UNIT – 4 (12 marks)

- Qualitative and Quantitative methods of analysis of C,H,N,S and halogens, molecular weight, molecular formula.
- IUPAC nomenclature of Organic Compounds, Optical and Geometrical isomerism.
- Inductive electromeric and conjugative effects, Carbonium ion, Carbanion & free radicals, Reaction mechanism – free radical, nucleophilic/electrophilic substitutions and additions.
- Preparation, properties and uses of Hydrocarbons, alkylhalides, alcohols, carbonyl compounds, carboxylic acids (and their derivatives). Aromatic hydrocarbons, halides, nitro compounds, amino compounds, phenols, carbonyl compound and Carboxylic acid. Basic treatment of carbohydrates, amino acids and proteins, Nucleic acids and enzymes.

PART-B : BIOLOGY

UNIT – 1 (10 marks)

1. THE LIVING WORLD

Nature and scope of Biology, Methods of Biology, Our place in the universe. Laws that govern the universe and life levels of organization, Causes and effect relationship.

Being alive – what its means? Present approach to understand life processes – molecular approach; life as an expression of energy; steady and homeostasis; self duplication and survival, adaptation; death as a positive part of life.

Origin of life and its maintenance. Origin and diversity of life, Physical and Chemical principles that maintain life process, the living crust and interdependence. The positive and negative aspects of progress in biological sciences.

2. UNITY OF LIFE

Cell as unit of life, Small biomolecules; water, minerals, mono-and oligosaccharides, lipids, amino acids, nucleotides and their chemistry, cellular location and function. Polysaccharides, proteins and nucleic acids. Enzymes; chemical nature, classification, mechanism in action-enzyme complex, allosteric modulation (brief), irreversible activation. Biomembranes. Fluid mosaic model of membrane in transport and recognition of external information (brief). Structural organization of the cell; light and electron microscopic views of cell, its organelles and their functions; Nucleus, mitochondria, chloroplasts, endoplasmic reticulum. Golgi complex, lysosomes, microtubules, cell wall, cilia and flagella, vacuoles, cell inclusions. A general account of cellular respiration. Fermentation, biological oxidation, mitochondrial electron transport chain, high energy bonds and oxidative phosphorylation, cell reproduction; Process of mitosis and meiosis.

UNIT – 2 (10 marks)

1. DIVERSITY OF LIFE

Introduction. The enormous variety of living things, the need for classification to cope with this variety; taxonomy and phylogeny; shortcoming of a two kingdom classification as plant and animals; a five kingdom classification. Monera, Protista, Plantae, Fungi and Animalia. The basic features of five kingdom classification; modes of obtaining nutrition – autotrophs and heterotrophs. Life style: procedures, consumers, and decomposers. Unicellularity and multicellularity, phylogenetic relationship. Concepts of species, taxon and categories – hierarchical levels of classification; binomial nomenclature; principles of classification and nomenclature; identification and nature of viruses and bacteriophages and organisms. Kingdom Monera – archaebacteria - life in extreme environments; Bacteria, actinomycetes, Cyanobacteria, example to illustrate autotrophic and heterotrophic life style; mineralizer - nitrogen fixers; Monera in cycling matter; symbiotic forms; disease producers. Kingdom Protista-Eucaryotic unicellular

organisms; development of flagella and cilia; beginning of mitosis; syngamy and sex. Various life styles shown in the major phyla. Conquest of land, bryophytes, ferns, gymnosperms and angiosperms, Vascularization; development of flower, fruit and seed. Kingdom fungi-lower fungi (Zygomycetes) higher fungi (Ascomycetes and Basidiomycetes); the importance of fungi, decomposers; parasitic forms; lichens and mycorrhizae, animal kingdom – animal body pattern and symmetry. The development of body cavity in invertebrate and vertebrate phyla. Salient feature with reference to habitat and examples of phylum porifera, coelenterata, helminths, annelids, mollusca, arthropoda, enchinoderms; chordata (Classes – fishes, amphibians, reptiles, bird and mammals) highlighting major characters.

2. ORGANISM AND ENVIRONMENT

Biosphere; flow of energy, trapping of solar energy, energy pathway, food chain, food web, biogeochemical cycles, calcium and sulphur, ecological imbalance and its consequences. Conservation of natural resources; renewable and non-renewable (in brief). Water and land management, wasteland development. Wild life and forest conservation; causes for the extinction of some wild life, steps taken to conserve the remaining species, concepts of endangered species – Indian examples, conservation of forests; Indian forests, hazards of deforestation, afforestation, environmental pollution, air and water pollution, sources, major pollutants of big cities of our country, their effects and methods of control, pollution due to nuclear fallout and waste disposal, effect and control, noise pollution – sources and effects.

UNIT – 3 (10 marks)

1. MULTICELLULARITY:STRUCTURE AND FUNCTION – PLANT LIFE

Modes of nutrition, transport of solutes water in plants, and photosynthesis, photochemical biosynthetic phases, diversity in photosynthetic pathways; photosynthetic electron transport and photophosphoration, photorespiration. Transpiration and exchange of gases. Stomatal mechanism. Osmoregulation in plants; water relations in plant cells, water potential, Reproduction and development in Angiosperm plants; asexual and sexual. Structure and functions of flower; development of male and female gametophytes in angiosperms, pollination, fertilization and development of endosperm, embryo, seeds and fruits. Differentiation and organ formation. Plant formation hormones and growth regulation; action of plant hormones in relation to seed dormancy and germination, optical dominance. Senescence and abscission.

2. MULTICELLULARITY:STRUCTURE AND FUNCTION - ANIMAL LIFE

Animal nutrition; organs of digestion and digestive process, nutritional requirements for carbohydrates, proteins, fats, minerals and vitamins:nutritional imbalances and deficiency diseases. Gas exchange and transport : Pulmonary gas exchange and organs involved, transport of gases in blood. Gas exchange in aqueous media.

Circulation:closed and open vascular systems, structure and pumping action of heart, arterial blood pressure, lymph. Excretion and osmoregulation. Ammonotelism, ureotelism, uricotelism, excretion of water and urea with special reference to man. Role of kidney in regulation of plasma, osmolarity of mammals, role of hormones as messengers and regulators. Nervous coordination: central, automatic and peripheral nervous systems, receptors, effectors, reflex action, basic physiology of special senses, integrative control by neuroendocrinal systems. Locomotion, joints, muscle movements, types of skeletal muscles according to types of movement, basic aspects of human skeleton. Reproduction;human reproduction, female reproductive cycles. Embryonic development in mammals (upto three germs layers).

UNIT – 4 (10 marks)

1. CONTINUITY OF LIFE

Heredity and variation: Introduction, Mendel's experiments with peas and idea of factors. Mendel's laws of inheritance. Genes:Packaging of heredity material in prokaryotes – bacterial chromosome; plasmid and eukaryote chromosomes. Extranuclear genes, viral genes, linkage (genetic) maps. Sex determination and sex linkage. Genetic material and its replication. Gene expression; genetic code, transcription, translation, gene regulation. Molecular basis of differentiation.

2. ORIGIN AND EVOLUTION OF LIFE

Origin of life: Living and non-living, chemical evolution; Oparin ideas, Millar-Urey experiments, Interrelationship among living organisms and evidence of evolution:fossil records including geological time scale, Morphological evidence – homology, vestigial organs, embryological similarities and biogeographical evidence. Darwin's two major contributions. Common origin of living organisms and recombination as sources of variability, selection acts upon variation, adapation (Lederberg's replica plating experiment for indirect selection of bacterial mutants), reproductive isolation, speciation. Role of selection change and drift in determining composition of population. Mutation their role in speciation, their origin in speciation and organisms.

UNIT – 5 (10 marks)

1. APPLICATION OF BIOLOGY

Biofertilisers – green manure, crop residues and nitrogen fixation (symbiotic, non-symbiotic). Applications of tissue culture and genetic engineering in crops. Domestication and introduction of animals. Livestock, poultry, fisheries (free water, marine, aquaculture). Improvement of animals;principles of animal breeding. Major animal diseases and their control. Insects and their products (silk, honey, wax and lac). Bioenergy, biomass, wood (combustion, gasification, ethanol). Cow dung-cakes, gobar gas plants as sources of hydrocarbons for producing petroleum, ethanol from starch and lignocellulose. Biotechnology, a brief historical account-manufacture of cheese, yoghurt, alcohol, yeast, vitamins, organic acids,

antibiotics, steroids, dextrans. Scaling up laboratory findings to industrial production. Production of insulin, human growth hormones, interferon, communicable diseases including diseases spread through blood transfusion (hepatitis, AIDS etc). immune response, vaccines and antisera. Allergies and inflammations. Inherited diseases and dysfunctions. Sex-linked diseases, genetic incompatibilities, and genetic counselling. Cancer – major types, causes, diagnosis and treatment. Tissue and organ transplantation.

PART-C : MATHEMATICS

UNIT - 1

1. SETS, RELATIONS AND FUNCTIONS (5 marks)

Sets and their representations, Union, intersection and complements of sets, and their algebraic properties, Relations, equivalence relations, mapping, one-one, into and onto mappings, composition of mappings.

2. MATRICES AND DETERMINANTS (5 marks)

Determinants and matrices of order two and three, properties of determinants. Addition and multiplication of matrices, adjoint and inverse of matrix.

3. PERMUTATIONS AND COMBINATIONS (5 marks)

Fundamental principle of counting; Permutation as an arrangement and combination as selection, Meaning $P(n,r)$ and $C(n,r)$. Simple applications.

4. SEQUENCES AND SERIES (5 marks)

Arithmetic, Geometric and Harmonic progressions. Insertion of Arithmetic Geometric and Harmonic means between two given numbers. Relation between A.M., G.M. and H.M. special series: an , an^2 , an^3 . Arithmetic – Geometric Series, Exponential and Logarithmic Series.

5. DIFFERENTIAL CALCULAS (5 marks)

Limits, continuity: differentiation of the sum, difference of the sum, difference, product and quotient of two functions, differentiation of trigonometric, inverse trigonometric, logarithmic, exponential, composite, and implicit functions; derivatives of order upto two. Applications of derivatives; rate of change of quantities. Maximum and minima of functions of one variable.

UNIT – 2

1. INTEGRAL CALCULUS (5 marks)

Integral as an anti-derivative, Fundamental integrals involving algebraic, trigonometric, exponential and logarithmic functions. Integration by substitution, by part and by partial fractions. Properties of definite integrals. Evaluation of definite integrals.

2. TWO DIMENSIONAL GEOMETRY (5 marks)

Recall of Cartesian system of rectangular co-ordinates in a plane, distance formula, area of the triangle, condition for the collinearity of three points and section formula,

centroid and in-centre of a triangle, slope of a line, parallel and perpendicular lines, intercepts of a line on the coordinates axes.

The straight line and pair of straight lines

Various forms of equations of a line, intersection of lines, angles between two lines, conditions for concurrence of three lines, distance of a point from a line. Equation of family of lines passing through the points of intersection of two lines, homogeneous equation of second degree in X and Y, angle between pair of lines through the origin.

3. VECTOR ALGEBRA (5 marks)

Vectors and scalars, addition of vectors, components of vector in two dimensions and three dimensional space, scalar and vector products. Scalar and vector triple product.

4. MEASURES OF CENTRAL TENDENCY AND DISPERSION (5 marks)

Calculation of mean, median and mode of grouped and ungrouped data. Calculation of standard deviation, variance and mean deviation for grouped and ungrouped data.

5. PROBABILITY (5 marks)

Probability of an event, addition and multiplication theorms of probability and their applications; conditional probability, Bayes' theorem, Probability distribution of a random variate; Binomial and Poisson distributions and their properties.

B.Pharm. II Year

(Direct Admission Through Lateral Entry)

The entrance examination paper shall consist of 100 objective type questions. The candidate shall be required to attempt all questions. The duration of entrance examination will be 2 hrs. The distribution of marks/question for each unit is as follows-

Unit-I	30 Marks/questions
Unit-II	30 Marks/questions
Unit-III	20 Marks/questions
Unit-IV	20 Marks/questions
Total	100 Marks/questions

UNIT- I (30 Marks)

Metrology– Systems of weights and measures. Calculations including conversion from one to another system. Percentage calculations and adjustments of products. Use of alligation method in calculations, Isotonic solutions.

Size separation– Size separation by sifting. Official Standard for powders. Sedimentation methods of size separation. Construction and working of cyclone separator.

Size reduction Objectives, and factors affecting size reduction, methods of size reduction–Study of Hammer mill, Ball mill, Fluid Energy Mill and Disintegrator.

Clarification and Filtration – Theory of filtration, Filter media; Filter aids and selection of filters. Study of the following filtration equipments—Filter Press, Sintered Filters, Filter Candles, Metafilter.

Extraction and Galenicals— Study of percolation and maceration and their modification, continuous hot extraction— Applications in the preparation of tinctures and extracts.

Introduction to Ayurvedic dosage forms.

Distillation—Simple distillation and Fractional distillation; Steam distillation and vacuum distillation. Study of vacuum still, preparation of Purified Water I.P. and water for injection I.P. Construction and working of the still used for the same.

Sterilization— Concept of sterilization and its differences from disinfection –Thermal resistance of micro-organisms. Detailed study of the following sterilization process.

Sterilization with moist heat, Dry heat sterilization, Sterilization by radiation, Sterilization by filtration and Gaseous sterilization.

Aseptic techniques- Application of sterilization processes in hospitals particularly with reference to surgical dressings and intravenous fluids. Precautions for safe and effective handling of sterilization equipment.

Processing of Tablets- Definition; Different types of compressed tablets and their properties. Processes involved in the production of tablets; Tablets excipients; Defects in tablets. Evaluation of Tablets; Physical Standards including Disintegration and Dissolution. Tablet coating—sugar coating; film coating, enteric coating and microencapsulation (Tablet coating may be dealt in an elementary manner)

Processing of Capsules— Hard and soft gelatin capsules; different sizes capsules; filling of capsules; handling and storage of capsules, Special applications of capsules.

Immunological products: sera, vaccines, toxoids & their preparations.

Incompatibilities in Prescriptions – Study of various types of incompatibilities –physical, chemical and therapeutic.

Posology— Dose and Dosage of drugs, Factors influencing dose, Calculations of doses on the basis of age, sex and surface area. Veterinary doses.

Monophasic liquid Dosage form— Theoretical aspects including commonly used vehicles, essential adjuvant like stabilizers, colourants and flavours, with examples.

Liquids for internal administration: Mixtures and concentrates, Syrups and Elixirs

Liquids for external administration or used on mucus membranes: Gargles Mouth washes Throat –paints, Douches,

Ear Drops, Nasal drops, Sprays, Liniments and Lotions.

Biphasic Liquid Dosage Forms- Suspension (elementary study)—Suspensions containing diffusible solids and liquids and their preparations. Study of the adjuvants used like thickening agents, wetting agents, their necessity and quantity to be incorporated. Suspensions of precipitate forming liquids like, tinctures, their preparations and stability. Suspensions produced by chemical reaction. An introduction to flocculated, non-flocculated suspension system.

Emulsions – Types of emulsions, identification of emulsion system, formulation of emulsions, selection of emulsifying agents. Instabilities in emulsions. Preservation of emulsions.

Semi –Solid Dosage Forms: Ointments— Types of ointments, classification and selection of dermatological vehicles. Preparation and stability of ointments by the following processes:

(i) Trituration (ii) Fusion (iii) Chemical reaction (iv) Emulsification.

Pastes- Difference between ointments and pastes, bases of pastes. Preparation of pastes and their preservation.

Jellies – An introduction to the different types of jellies and their preparation.

An elementary study of poultice.

Suppositories and pessaries –Their relative merits and demerits, types of suppositories, suppository bases, classification, properties, Preparation and packing of suppositories. Use of suppositories for drug absorption.

Sterile Dosage Forms: Parenteral dosage forms—Definitions, General requirements for parenteral dosage forms. Types of parenteral formulations, vehicles, adjuvants, processing, personnel, facilities and Quality control. Preparation of Intravenous fluids and admixtures –Total parenteral nutrition, Dialysis fluids.

Sterility testing, Particulate matter monitoring –Faulty seal packaging.

UNIT–II

(30 Marks)

General discussion on the following inorganic compounds including important physical and chemical properties, medicinal and Pharmaceutical uses, storage conditions and chemical incompatibility.

Acids, bases and buffers: Boric acid, Hydrochloric acid, strong ammonium hydroxide, Calcium hydroxide, Sodium hydroxide and official buffers.

Antioxidants— Hypophosphorous acid, Sulphur dioxide, Sodium bisulphite, Sodium metabisulphite, Sodium thiosulphate, Nitrogen and Sodium Nitrite.

Antacids- Sodium bicarbonate, Aluminium hydroxide gel, Aluminium Phosphate, Calcium carbonate, Magnesium carbonate, Magnesium trisilicate, Magnesium oxide, Combinations of antacid preparations.

Topical Agents- Protectives-Talc, Zinc Oxide, Calamine, Zinc stearate, Titanium dioxide, Silicone polymers.

Antimicrobials and Astringents- Hydrogen peroxide*, Potassium permanganate, Chlorinated lime, Iodine, Solutions of Iodine, Povidone-iodine, Boric acid, Borax. Silver nitrate, Mild silver protein, Mercury, Yellow mercuric oxide, Ammoniated mercury.

Astringents: Alum and Zinc Sulphate.

Major Intra and Extracellular electrolytes- Electrolytes used for replacement therapy –Sodium chloride and its preparations, Potassium chloride and its preparations.

Physiological acid-base balance and electrolytes used-Sodium acetate, Potassium acetate, Sodium bicarbonate injection, Sodium citrate, Potassium citrate, Sodium lactate injection, Ammonium chloride and its injection. Combination of oral electrolyte powders and solutions.

Limit tests for Arsenic, chloride, sulphate, Iron and Heavy metals.

Brief chemistry and role of proteins, carbohydrates, Lipids, Vitamins, Enzymes, Minerals, polypeptides and amino acids, classification, Qualitative tests, Biological value, Deficiency diseases.

The Chemistry of following Pharmaceutical organic compounds: (nomenclature, chemical structure, uses and the important Physical and Chemical properties

Antiseptics and Disinfectants- Proflavine, Benzalkoniumchloride, Cetrimide, Chlorocresol, Chloroxylyene, Formaldehyde solution, Hexachlorophene, Liquified phenol, Nitrofurantoin.

Sulfonamides- Sulfadiazine, Sulfaguanidine, Phthalysulfathiazole, Succinylsulfathiazole, Sulfadimethoxine, Sulfamethoxypridazine, Sulfamethoxazole, co-trimoxazole, Sulfacetamide.

Antileprotic Drugs – Clofazimine, Thiambutosine, Dapsone, Solapsone.

Anti-tubercular Drugs- Isoniazid, PAS, Streptomycin, Rifampicin, Ethambutol, Thiacetazone, Ethionamide, Cycloserine, Pyrazinamide.

Antibiotics –Benzyl Penicillin, Phenoxy methyl Penicillin, Benzathine Penicillin Ampicillin, Cloxacillin, Carbenicillin, Gentamicin, Neomycin, Erythromycin, Tetracycline, Cephalexin, Cephaloridine, Cephalothin, Griseofulvin, Chloramphenicol.

Antimalarial Drugs- Chloroquine, Amodiaquine, Primaquine, Proguanil, Pyrimethamine, Quinine, Trimethoprim.

General Anaesthetics- Halothane, Cyclopropane, Diethyl ether, Methohexital sodium, Thiopental sodium, Trichloroethylene.

Ephedrine, Pseudoephedrine.

Adrenergic Antagoinst – Tolazoline, Propranolol, Practolol.

Cholinergic Drugs- Neostigmine, Pyridostigmine, Pralidoxime, Pilocarpine, Physostigmine.

Cholinergic Antagonists- Atropine, Hysocine, Homatropine, Propantheline, Benztrrophine, Tropicamide, Biperiden

Diuretic Drugs- Furosemide, Chlorothiazide, Hydrochlorothaizide, Benzthiazide, Urea, Mannitol, Ethacrynic Acid.

Cardiovascular Drugs- Ethyl nitrite, Glyceryl trinitrate, Alpha methyl dopa, Guanethidine, Clofibrate, Quinidine.

Hypoglycemic Agents- Insulin, Chlorpropamide, Tolbutamide, Glibenclamide, Phenformin, Metformin.

Coagulants and Anti Coagulants- Heparin, Thrombin, Menadione, Bishydroxycoumarin, Warfarin Sodium.

Local Anaesthetics –Lignocaine, Procaine, Benzocaine.

Histamine and Anti-histaminic Agents- Histamine, Diphenhydramine*, Promethazine, Cyproheptadine, Mepyramine, Pheniramine, Chlorpheniramine.

Analgesics and Anti-pyretics–Morphin, Pethidine, Codeine, Methadone, Aspirin, Paracetamol, Analgin, Dextropropoxyphene, Pentazocine.

Non-steroidal anti-inflammatory Agents – Indomethacin, phenylbutazone, Oxyphenbutazone, Ibuprofen, Thyroxine and Antithyroids –Thyroxine, Methimazole, Methylthiouracil, Propylthiouracil.

UNIT – III

(20 marks)

1. Identification tests, therapeutic effects and pharmaceutical applications of alkaloids, terpenoids, glycosides, volatile oils, tannins and resins.

Laxatives(Aloes, Rhuburb, Castor oil, Ispaghula, Senna), Cardiotonics (Digitalis, Arjuna), Carminatives & G.I. regulators (Umbelliferous fruits, Coriander, Fennel, Ajowan, Cardamom, Ginger, Black pepper, Asafoetida, Nutmeg, Cinnamon, Clove),

Drugs acting on nervous system (Hyoscyamus, Belladonna, Aconite, Ashwagandha, Ephedra, Opium, Cannabis, Nuxvomica), Antihypertensives (Rauwolfia), Antitumour(Vinca), Diuretics (Gokhru, Punarnava), Antimalarials(Cinchona) Oxytocics(Ergot), Enzymes (Papaya, Diastase, Yeast), **Perfumes and flavouring agents** (Peppermint Oil, Lemon Oil,

Orange Oil, Lemon grass Oil, Sandalwood)

2. Pharmacy Act, 1948 – The General study of the Pharmacy Act with special reference to Education Regulations, working of State and Central Councils, constitution of these councils and functions, Registration procedures under the Act.

The Drugs and Cosmetics Act, 1940— General study of the Drugs and Cosmetics Act and the Rules thereunder. Definitions and salient features related to retail and wholesale distribution of drugs. The powers of Inspectors, the sampling procedures and the procedure and formalities in obtaining licences under the rule. Facilities to be provided for running a Pharmacy effectively. General study of the Schedules with special reference of schedules C, C₁, F, G, J, H, P and X and salient features of labelling and storage condition of drugs.

UNIT – IV

(20 Marks)

Blood-Composition of blood, functions of blood elements. Blood group and coagulation of blood. Brief information regarding disorders of blood.

Cardiovascular System- Structure and functions of various parts of the heart. Arterial and venous systems with special reference to the names and positions of main arteries and veins. Blood pressure and its recording. Brief information about cardiovascular disorders.

Urinary system- Various parts of urinary system and their functions, structure and functions of kidney. Physiology of Urine formation. Pathophysiology of renal diseases and oedema.

Nervous System- Various parts of central nervous system, brain and its parts, functions and reflex action. Anatomy and Physiology of autonomic nervous system.

Digestive system- names of the various parts of digestive system and their functions. Structure and functions of liver, physiology of digestion and absorption.

Endocrine glands and Hormones- Locations of the glands, their hormones and functions. Pituitary, thyroid, Adrenal and Pancreas.

Communicable diseases — Causative agents, modes of transmission and prevention.

Respiratory infections (Chicken pox, measles. Influenza, diphtheria, whooping cough and tuberculosis), Intestinal infections (Poliomyelitis. Hepatitis. Cholera. Typhoid, Food poisoning, Hookworm infection), Arthropod born infections (plague, Malaria, Filariasis), Surface infections(Rabies, Trachoma, Tetanus, Leprosy), Sexually transmitted diseases(Syphilis. Gonorrhoea. AIDS).

Non-communicable diseases – Causative agents, prevention, care and control; Cancer, Diabetes, Blindness, Cardiovascular

diseases.

Demography and family planning— Demography cycle, fertility, family planning, contraceptive methods, behavioural methods, natural family planning method, chemical method, mechanical methods, hormonal contraceptives, population problem of India.

First aid— Emergency treatment in shock, snake-bite, burns poisoning, heart disease, fractures and resuscitation methods. Elements of minor surgery and dressings.

Pharmacological classification of drugs. The discussion of drugs should emphasize the following aspect:

Drugs acting on the Central Nervous System-General anaesthetics, adjunction to anaesthesia, intravenous anaesthetics.

Analgesic antipyretics and non-steroidal anti-inflammatory drugs, Narcotic analgesics, Antirheumatic and antigout remedies, Sedatives and Hypnotics, Psychopharmacological agents, anti convulsants, analeptics.

Drug acting on autonomic nervous system- Cholinergic drug, Anticholinergic drugs, anti cholinesterase drugs.

Adrenergic drugs and adrenergic receptor blockers.

Neurones blockers and ganglion blockers.

Neuromuscular blockers, drugs used in myasthenia gravis.

Antacids, Physiological role of histamine and serotonin, Histamine and Antihistamines, Prostaglandins.

Cardio Vascular drugs- Cardiotonics, Antiarrhythmic agents, Antianginal agents, Antihypertensive agents, Peripheral Vasodilators and drugs used in atherosclerosis.

Drugs acting on the blood and blood forming organs- Haematinics, Coagulants and anti Coagulants, Haemostatics, Blood substitutes and plasma expanders.

Drugs affecting renal function- Diuretics and antidiuretics.

Hormones and hormone antagonists – hypoglycemic agents, Antithyroid drugs, sex hormones and oral contraceptives, corticosteroids.

Drugs acting on digestive system- Carminatives, digestants Bitters, Antacids and drugs used in Peptic ulcer, purgatives, and laxatives, Antidiarrhoeals, Emetics, Antiemetics, Antispasmodics.

Chemotherapy of microbial disease- Urinary antiseptics, Sulphonamides, Penicillins, Streptomycin, Tetracyclines and other antibiotics, Antitubercular agents, Antifungal agents, antiviral drugs, antileprotic drugs.

SYLLABI FOR GURUKULA KANGRI ENTRANCE EXAMINATION

M.P.Ed. And B.P.Ed.

The entrance examination paper of each subject/course shall consist of 60 objective type questions for M.P.Ed. & 30 Objective type questions for B.P.Ed. The candidate shall be required to attempt all the questions. The syllabus for entrance exam for each subject/course along with distribution of marks, wherever applicable, is as follows:

M.P.Ed. (Master of Physical Education)

Entrance Test - 60 Marks

History, Principles and Foundation of Physical Education

- Meaning, Definition and Scope of Physical Education
- Aims and Objective of Physical Education
- Importance of Physical Education in present era.
- Misconceptions about Physical Education.
- Relationship of Physical Education with General Education.
- Physical Education as an Art and Science

Anatomy and Physiology

- Brief Introduction of Anatomy and physiology in the field of Physical Education.
- Introduction of Cell and Tissue.
- The arrangement of the skeleton - Function - of the skeleton
- Ribs and Vertebral column and the extremities - joints of the body and their types
- Gender differences in the skeleton.
- Types of muscles.

Health Education and Environmental Studies

- Concept, Dimensions, Spectrum and Determinants of Health
- Definition of Health, Health Education, Health Instruction, Health Supervision
- Aim, objective and Principles of Health Education
- Health Service and guidance instruction in personal hygiene
- Definition, Scope, Need and Importance of environmental studies.
- Concept of environmental education, Historical background of environmental education,
- Celebration of various days in relation with environment.
- Plastic recycling & probation of plastic bag / cover.
- Role of school in environmental conservation and sustainable development

Olympic Movement

- Philosophy of Olympic movement
- The early history of the Olympic movement
- The significant stages in the development of the modern Olympic movement
- Educational and cultural values of Olympic movement

- Significance of Olympic Ideals, Olympic Rings, Olympic Flag
- Olympic Protocol for member countries
- Olympic Code of Ethics
- Olympism in action
- Sports for All

Officiating and Coaching

- Concept of officiating and coaching
- Importance and principles of officiating
- Relation of official and coach with management, players and spectators
- Measures of improving the standards of officiating and coaching

Yoga Education

- Meaning and Definition of Yoga
- Aims and Objectives of Yoga
- Yoga in Indian Ancient Culture
- Need and Importance of Yoga in Physical Education and Sports
- The Astanga Yoga: Yama, Niyama, Asana, Pranayama, Pratyahara, Dharana, Dhyana and Samadhi
- Yoga in the Bhagavadgita - Karma Yoga, Raja Yoga, Jnana Yoga and Bhakti Yoga

Educational Technology and Methods of Physical Education

- Education and Education Technology- Meaning and Definitions
- Types of Education- Formal, Informal and Non- Formal education.
- Educative Process
- Teaching Technique - Lecture method, Command method, Demonstration method, Imitation method, project method
- Teaching Procedure - Whole method, whole - part - whole method, part - whole method.
- Presentation Technique - Personal and technical preparation
- Command- Meaning, Types and its uses in different situations.

Organization and Administration

- Meaning and importance of Organization and Administration in physical education
- Qualification and Responsibilities of Physical Education teacher and pupil leader
- Planning and their basic principles,

- Program planning: Meaning, Importance.
- Functions of Planning, organizing, staffing, directing, communicating, co-ordination, Controlling, evaluating and innovating.

Contemporary Issues in Physical Education, Fitness and Wellness

- Definition, Aims and Objectives of Physical Education, fitness and Wellness
- Importance and Scope of fitness and wellness
- Modern concept of Physical fitness and Wellness
- Physical Education and its Relevance in Inter Disciplinary Context.
- Fitness - Types of Fitness and Components of Fitness
- Understanding of Wellness
- Modern Lifestyle and Hypokinetic Diseases - Prevention and Management
- Physical Activity and Health Benefits

Sports Nutrition and Weight Management

- Meaning and Definition of Sports Nutrition
- Basic Nutrition guidelines
- Role of nutrition in sports
- Factor to consider for developing nutrition plan
- Carbohydrates, Protein, Fat - Meaning, classification and its function
- Role of carbohydrates, Fat and protein during exercise
- Vitamins, Minerals, Water - Meaning, classification and its function
- Role of hydration during exercise, water balance
- Meaning of weight management Concept of weight management in modern era Factor affecting weight management and values of weight management
- Concept of BMI (Body mass index), Obesity and its hazard, Myth of Spot reduction.
- Dieting versus exercise for weight control, Common Myths about Weight Loss
- Obesity - Definition, meaning and types of obesity,
- Health Risks Associated with Obesity,
- Obesity - Causes and Solutions for Overcoming.

Sports Training

- Meaning and Definition of Sports Training
- Aim and Objective of Sports Training
- Principles of Sports Training
- System of Sports Training - Basic Performance, Good Performance and High Performance Training
- Strength - Mean and Methods of Strength Development
- Speed - Mean and Methods of Speed Development
- Endurance - Mean and Methods of Endurance Development
- Coordination - Mean and Methods of coordination

Development

- Flexibility - Mean and Methods of Flexibility Development
- Computer Application in Physical Education
- Meaning, need and importance of information and communication technology (ICT).

Application of Computers in Physical Education

- Components of computer, input and output device
- Application software used in Physical Education and sports
- Introduction to MS Word
- Creating, saving and opening a document
- Formatting Editing features Drawing table ,
- page setup, paragraph alignment, spelling and grammar check printing option, inserting
- page number, graph, footnote and notes

Sports Psychology and Sociology

- Meaning, Importance and scope of Educational and Sports Psychology
- General characteristics of Various Stages of growth and development
- Types and nature of individual differences; Factors responsible -Heredity and environment
- Psycho-sociological aspects of Human behaviour in relation to physical education and sports
- Nature of learning, theories of learning, Laws of learning,
- Plateau in Learning; & transfer of training
- Meaning and definition of personality, characteristics of personality, Dimension of personality, Personality and Sports performance
- Nature of motivation: Factors influencing motivation; Motivation and techniques and its impact on sports performance.
- Mental Preparation Strategies: Attention focus, Self- talk, Relaxation, Imaginary.
- Aggression and Sports, Meaning and nature of anxiety, Kinds of anxiety
- Meaning and nature of stress; Types of stress, Anxiety, Stress, Arousal and their effects on sports performance
- Orthodoxy, customs, Tradition and Physical Education.
- Festivals and Physical Education.
- Socialization through Physical Education.
- Social Group life, Social conglomeration and Social group, Primary group and Remote group.

Sports Medicine, Physiotherapy and Rehabilitation

- Sports Medicine: Meaning, Definition, Aims, Objectives, Modern Concepts and Importance.
- Athletes Care and Rehabilitation: Contribution of Physical Education Teachers and Coaches.

- Need and Importance of the study of sports injuries in the field of Physical Education.
- Prevention of injuries in sports - Common sports injuries - Diagnosis.
- Definition - Guiding principles of physiotherapy, Importance of physiotherapy.
- Introduction and demonstration of treatments - Electrotherapy - infrared rays - ultraviolet rays -short wave diathermy - ultrasonic rays.

Curriculum Design

- Need and importance of curriculum, Need and importance of curriculum development, the role of the teacher in curriculum development.
- Factors affecting curriculum - Social factors - Personnel qualifications - Climatic consideration - Equipment and facilities -Time suitability of hours.
- Focalization, Socialization, Individualization, Sequence and operation
- Steps in curriculum construction.

Measurement and Evaluation in Physical Education

- Meaning of Test & Measurement & Evaluation in Physical Education
- Need & Importance of Test & Measurement & Evaluation in Physical Education
- Principles of Evaluation
- Criteria of good Test
- Criteria of tests, scientific authenticity (reliability, objectivity, validity and availability of norms)
- Type and classification of Test
- Administration of test, advance preparation: Duties during testing and after testing.
- AAHPER youth fitness test
- National physical Fitness Test
- Indiana Motor Fitness Test
- JCR test
- U.S Army Physical Fitness Test

Kinesiology and Biomechanics

- Meaning and Definition of Kinesiology and Sports Biomechanics
- Importance of Kinesiology and Sports Biomechanics to Physical Education Teacher, Athletes and Sports Coaches.
- Terminology of Fundamental Movements
- Fundamental concepts of following terms - Axes and Planes, Centre of Gravity, Equilibrium, Line of Gravity
- Classification of Joints and Muscles
- Types of Muscle Contractions
- Posture - Meaning, Types and Importance of good posture.
- Fundamental concepts of following terms- Angle of Pull, All or None Law, Reciprocal Innovation

- Force - Meaning, definition, types and its application to sports activities
- Lever - Meaning, definition, types and its application to human body.
- Newton's Laws of Motion: Meaning, definition and its application to sports activities.
- Projectile - Factors influencing projectile trajectory.

Research and Statistics in Physical Education

- Definition of Research
- Need and importance of Research in Physical Education and Sports.
- Scope of Research in Physical Education & Sports.
- Classification of Research
- Research Problem, Meaning of the term, Location and criteria of Selection of Problem, Formulation of a Research Problem, Limitations and Delimitations.
- Need for surveying related literature.
- Literature Sources, Library Reading
- Research Proposal, Meaning and Significance of Research Proposal.
- Preparation of Research proposal / project.
- Research Report: A group project is to be undertaken by a small batch of students under the supervision of a teacher, wherein it is expected to survey school facilities of physical education, health assessment programme evaluation, fitness status of the students, staff and other stakeholders etc. and submit the report to the institution.
- Statistics: Meaning, Definition, Nature and Importance
- Class Intervals: Raw Score, Continuous and Discrete Series, Class Distribution, Construction of Tables
- Graphical Presentation of Class Distribution: Histogram, Frequency Polygon, Frequency Curve. Cumulative Frequency Polygon, Pie Diagram.

Theory of Sports and Games

- History and development of the Game and Sports
- Athletics
- Badminton
- Basketball
- Cricket
- Football
- Gymnastic
- Hockey
- Handball
- Kabaddi
- Kho-Kho
- Tennis
- Volleyball
- Yoga

- Ground preparation, dimensions and marking
- Standard equipment and their specifications
- Ethics of sports and sportsmanship

Sports Management

- Nature and Concept of Sports Management.
- Progressive concept of Sports management.
- The purpose and scope of Sports Management.
- Essential skills of Sports Management.
- Qualities and competencies required for the Sports Manager.
- Event Management in physical education and sports.
- Meaning and Definition of leadership
- Leadership style and method.
- Elements of leadership.
- Forms of Leadership: Autocratic, Laissez-faire, Democratic, Benevolent Dictator
- Qualities of administrative leader.
- Preparation of administrative leader.
- Leadership and Organizational performance.
- Sports Management in Schools, colleges and Universities.
- Factors affecting planning
- Planning a school or college sports programme.
- Directing of school or college sports programme.
- Controlling a school, college and university sports programme.

Physical Fitness Test - 25 Marks

Sports Achievement Weightage - 10 Marks

(Only for the games & sports listed by AIU)

- International Representation.
- Senior National Games Participation (1st, 2nd and 3rd place).
- Senior National Games Participation.
- All India Interuniversity Participation (1st, 2nd and 3rd place).
- All India Inter-University Participation.
- North-Zone Inter-University/State Sports Participation (1st, 2nd and 3rd place).
- North-Zone Inter-University/State Sports Participation.
- Inter-Collegiate/District Sports Participation (1st, 2nd and 3rd place).
- Inter-Collegiate/District Sports Participation.

Interview - 5 Marks

Overall Distribution of Marks

Entrance Test	60 Marks
Physical Fitness Test	25 Marks
Sports Achievement	10 Marks
Interview	5 Marks
Total	100 Marks

B.P.Ed. (Bachelor of Physical Education)

Entrance Test - 30 Marks

- Current Affairs
- General Knowledge.
- Rules & Regulations of Games & Sports.
- Measurement of various field of Games & Sports
- Sports Personalities & their Contributions
- Championship & Historical aspects.
- Award & Prize.
- History of Physical Education and Sports
- Ancient Olympics- Aims, Objective & Motto
- Modern Olympics-Aims, Objective & Motto
- Asian Games
- Sports Association & Federation
- Association of Indian Universities (AIU)
- Sports Institutions
- Sports Scholarship

Physical Fitness Test - 50 Marks

Sports Achievement Weightage - 10 Marks

(Only for the games & sports listed by AIU)

- International Representation.
- Senior National Games Participation (1st, 2nd and 3rd place).
- Senior National Games Participation.
- All India Interuniversity Participation (1st, 2nd and 3rd place).
- All India Inter-University Participation.
- North-Zone Inter-University/State Sports Participation (1st, 2nd and 3rd place).
- North-Zone Inter-University/State Sports Participation.
- Inter-Collegiate/District Sports Participation (1st, 2nd and 3rd place).
- Inter-Collegiate/District Sports Participation.

Interview - 10 Marks

Overall Distribution of Marks

Entrance Test	30 Marks
Physical Fitness Test	50 Marks
Sports Achievement	10 Marks
Interview	10 Marks
Total	100 Marks