

परिशिष्ट-2 (i)**बिहार संयुक्त प्रवेश प्रतियोगिता परीक्षा (पार्श्वक प्रवेश)-2019 के लिये अभियंत्रण
पाठ्यक्रम ग्रुप का मार्गदर्शक पाठ्यक्रम****विषय खण्ड-(I)****MATHEMATICS :**

- 1. Solid Geometry :** Cartesian, Cylindrical, Polar, Spherical Polar Co-ordinates, Direction ratios and direction cosines, equations of Planes and Straight lines shortest distance, Co-ordinate transformations, Spheres, Cones, Cylinders, Ellipoids, Paraboloids and Hyperpoloid, Standard equations. With illustration, tangent, Planes and normals.
- 2. Differential Calculus :** Review of Limit. Continuity and differentiability of functions of a Single Variable with terminology, Properties of Continuous functions, geometrical illustrations, applications of differentiation to approximate computations, Successive differentiation, Leibnitz rule, Rolle's theorem, Cauchy's mean value theorem (Lagrange mean value theorem as a special case). Taylor and Maclaurin expansions, L-Hospital rule, Review of maxima and minima of function of Single Variable, Concavity and Convexity of a Curve, Points of inflexion, asymptotes and Curvature. Limit, Continuity and differentiability of function, geometrical interpretations, differentials, derivatives of composite and implicit function, derivative of higher orders and their Commutativity, Euler's theorem on homogeneous function. Taylor expansion of fuctions of several variables, maxima and minima of functions of several variables. Lagrange method of multipliers.
- 3. Integral Calculus :** Riemann integrals (upper and lower sums), definite integral as the limit of a sum, Fundamental theorem of integral calculus, mean value theorems, evaluation of definite integrals, reduction formula, convergence of improper integrals, tests of convergence, beta and gamma functions, elementary properties, differentiation under integral sign, differentiation of integrals with variable limits, Leibnitzrule, integrals dependent on a parameter applications, Rectification, double and triple integrals, computation of surfaces and volumes, change of variables in double integrals, Jacobean transformations, integrals dependent on parameters application.
- 4. Differential Equations :** First order equation variable separable, exact, homogeneous, linear and Bernoulli's form, second order equations with constant coefficients, Euler equations, methods of their solution, Dependence and independence of Solutions, wronskian systems of first order equations (Simple type).
- 5. Vector Calculus :** Scalar and vector fields, level surfaces, directional derivative, gradient, curl, divergence, laplacian, line and surface integrals, theorem of green, Gauss and stokes, Orthogonal Curvilinear coordinates, Infinite Series; Sequence and series their convergence and divergence, test of convergence, Power Series - uniform and absolute convergence.
- 6. Matrices :** Algebra of matrices, vector space, linear dependence of vectors, rank and inverse of a matrix, solutions of algebraic equations, consistency conditions, eigen value and eigen vectors, similarity transformation reduction to a diagonal matrix.
- 7. Fourier Series :** Its convergence, Drichlet conditions, half range series.

विषय खण्ड-(II)**ENGINEERING MECHANICS :**

- 1. Introduction :** Idealization of Mechanics, concept of Rigid Body. External Forces [Body forces & Surface Forces], Laws of Mechanics.
- 2. Vector Methods :** Equality and Equivalence of vectors, Free and Bound Vectors, Principle of Transmissibility of forces, Moment of a force about a point and about a line, couple and moment of a couple, couple moment as a free - vector, Addition and subtraction of couples.
- 3. Various Systems of Forces :** Statically Equivalent Force Systems, Simplest Equivalent of a System of forces.
- 4. Equilibrium :** Force analysis, Free Body Diagram, Equations of equilibrium and their applications to

various system of forces, Plane Trusses.

5. **Friction** : Friction on dry surfaces, static, Kinetic and rolling friction, applications to inclined planes, wedge and blocks and belts and pulleys.
6. **Kinematics and Kinetics of a Particle** : Rectilinear and Curvilinear translations, Normal and tangential components of acceleration, Projectile motion on a smooth vertical curve.
7. **Impulse and Momentum** : Linear Impulse and linear momentum, Central Impact of elastic, semi-elastic & Plastic bodies.
8. **Kinematics and Kinetics of Rigid Bodies** : Angular Velocity and angular acceleration, Effective Forces on a rigid body, D'Alembert's Principle-Application to Highways and Railway-tracks, Instantaneous centre of rotation, compound pendulum, centre of percussion, Rotation of Rigid bodies, Rolling motion, Plane motion of rigid bodies, simple application - Four bar mechanism.
9. **Work, Energy and Power** : Work done by forces and couples, Potential, Elastic and kinetic energy, work energy, conservation of energy, concept of power and efficiency.

विषय खण्ड-(III)

TECHNICAL ENGLISH :

1. **Grammar and Comprehension** : (a) Subject - Verb concord (b) Tense (c) Voice (d) Synthesis (e) Common Errors (f) Vocabulary, Unseen Passage will be set to test the language skills mentioned above.
2. **Business Correspondence** : (a) Drafting Official and Business Letters (b) Drafting Circulars and Official Orders / Instructions (c) Drafting Minutes and Agenda of the Meeting.
3. **Elementary Spoken English** : Elementary theory of phonetics.
4. **Sentence and Paragraph Writing.**
5. **Report Writing** : (i) Importance of Reports in the Present day Industrial Set-up (ii) Classification of Reports (iii) Writing of Reports :- (a) Format (b) Mechanics of language.
6. **Technical Description of things and Processes.**
7. **Precis Writing.**
8. **Spoken English.**

परिशिष्ट-2 (ii)**INDICATIVE SYLLABUS FOR PARA-MEDICAL COURSE GROUP
OF BCECE(LE)-2019****विषय खण्ड-(I)****ANATOMY & PHYSIOLOGY :****I. Anatomy :**

- 1) Introduction of bones and muscles
- 2) Different Vital Organs:-
 - i) Respiratory organ
 - ii) Circulatory organ
 - iii) Digestive organ
 - iv) Reproductive organ
 - v) Liver & Spleen
 - vi) Excretory organ
 - vii) Central Nervous organ
 - viii) Sense organ

3) Embryology

II. Physiology :

- 1) Introduction- Definition
- 2) Basic knowledge of various system :-
 - i) Cardio-Vascular system
 - ii) Respiratory
 - iii) Digestive
 - iv) Excretory
 - v) Reproductive
 - vi) Endocrine
 - vii) Lymphatic
 - viii) Central Nervous
 - xi) Circulatory
- 3) Special Senses:-
 - i) Auditory system
 - ii) Olfactory
 - iii) Visual
 - iv) Tactile sensation
 - v) Taste sensation
- 4) Pulse, B.P.- Systolic & Diastolic Blood Pressure, Heart sound (Normal & Abnormal), Cyanosis, Edema and Temperature regulation.
- 5) Skin.

विषय खण्ड-(II)**PATHOLOGY, MICROBIOLOGY & BIOCHEMISTRY :****I. Pathology :**

- 1) General Pathology- Introduction
- 2) Hematology:-
 - i) Haemoglobin:- a) Estimation
b) Other details

- ii) E.S.R.: a) Estimation
b) other details
- iii) Complete Blood Count (C.B.C)
- iv) Blood of its functions
- v) Blood Banking
- vi) Blood coagulation
- vii) Haemoopoesosis
- viii) Anemia's
- ix) Heamoglobinopathy
- 3) Clinical Pathology:-
 - i) Body fluid
 - Urin; Stool & Cerebro-Spinal Fluid
 - a) Collection
 - b) Normal Values
 - c) Physical, Chemical and Microscopic Examination
 - Other Body Fluid
 - a) Collection
 - b) Normal Values
 - c) Physical, Chemical and Microscopic Examination and
 - d) Transuded and Exudates

II. Microbiology

- 1) Introduction
- 2) Bacteriology of water, food
- 3) Bacteriology of Milk, Pasteurization of Milk
- 4) Lab Diagnosis of:-
 - i) Staphylococcal infection
 - ii) Streptococcal infection
 - iii) Diphtheria
 - iv) Meningitis
 - v) Typhoid fever
 - vi) Cholera
 - vii) Tuberculosis
 - viii) Bacillary dysentery
 - xi) Septicemia
- 5) Methods of Colony count
- 6) Disposal of Bio-Medical waste
- 7) Sterilization
- 8) Culture-Media
- 9) Identification methods of Bacteria by colony character and Stunning & Motility tests
- 10) Microbial world and structure of Mien be
- 11) Antibiotic sensitivity testing
- 12) Morphological variations and classification of bacteria
- 13) Physiology and growth requirement of bacteria
- 14) Anaerobiosis methods
- 15) Disposal of laboratory waste
- 16) Methods of inclusion of culture media from different samples

III. Bio-Chemistry :

- 1) Introduction of Bio-chemistry:-
 - a) pH indicator
 - b) Ionization of water buffer, pH value of solution using.
 - c) Definition and preparation of reagent
- 2) General Bio-chemistry:-
 - i) Collection & recording of bio-chemical specimen, separation of serum / plasma preservation and disposal of biological materials
 - ii) Chemical examination of urine and stool
 - iii) Chemical examination of other body fluids & transuded & exudates
 - iv) Laboratory management and maintenance of records
- 3) Introductory knowledge of:-
 - i) Carbohydrate
 - ii) Protein
 - iii) Lipid
- 4) Electrolytes
- 5) Liver function test
- 6) Kidney function test
- 7) Lipid profile
- 8) Analytical Bio-chemistry:-
 - i) Estimation of specific gravity of urine
 - ii) Urinary protein
 - iii) Blood sugar
 - iv) Blood urea
 - v) Serum creatinine
 - vi) Blood cholesterol
 - vii) Serum Bilirubin, SGPT, SGOT
 - viii) Alkaline phosphate
 - xi) Australia antigen

विषय खण्ड-(III)**TECHNICAL ENGLISH :**

1. Grammar and Comprehension :
 - a) Subject verb concord
 - b) Tense
 - c) Voice
 - d) Synthesis
 - e) Common errors
 - f) Vocabulary
 - g) Unseen passage to test language skills
2. Elementary Spoken English (Theory of Phonetics)
3. Sentence and paragraph writing
4. Report Writing :
 - a) Classification, Format and writing of reports
 - b) Mechanics of language
5. Technical Description of things and processes
6. Precis writing
7. Spoken English.

परिशिष्ट-2 (iii)**INDICATIVE SYLLABUS FOR PHARMACY COURSE GROUP OF
BCECE(LE)-2019****विषय खण्ड-(I)****PHARMACEUTICS-I**

1. Introduction of different dosage forms, Their classification with examples-their relative applications. Familiarisation with new drug delivery systems.
 2. Metrology-Systems of weights and measures. Calculations including conversion from one to another system. Percentage calculations and adjustments of products. Use of allegation method in calculations, Isotonic solutions.
 3. Metrology-Systems of weights and measures. Calculations including conversion from one to another system. Percentage calculations and adjustments of products. Use of allegation method in calculations, Isotonic solutions.
 4. Packing of Pharmaceuticals-Desirable features of a container-type of containers. Study of glass and plastics as materials for containers and rubber as a material for closures-their merits and demerits. Introduction to aerosol packaging.
 5. Size reduction Objectives, and factors affecting size reduction, methods of size reduction-Study of Hammer mill, Ball mill, Fluid Energy Mill and Disintegrator.
 6. Size separation-Size separation by sifting. Official Standard for powders. Sedimentation methods of size separation. Construction and working of cyclone separator.
 7. Mixing and Homogenisation-Liquid mixing and powder mixing, Mixing of semisolids, Study of Silverson Mixer-Homogeniser, planetary Mixer; Agitated powder mixer; Triple Roller Mill; Propeller Mixer, Colloid Mill and Hand Homogeniser. Double cone mixer.
 8. 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.
 9. Extraction and Galenicals-
 - (a) Study of percolation and maceration and their modification, Continuous hot extraction-Applications in the preparation of tinctures and extracts.
 - (b) Introduction to Ayurvedic dosage forms.
 10. Heat processes Evaporation -Definitions Factors affecting evaporation-Study of evaporating still and Evaporating Pan.
 11. 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.
 12. Introduction to drying processes-Study of Tray Dryers: Fluidized Bed Dryer, Vacuum Dryer and Freeze Dryer.
 13. Sterilization-Concept of sterilization and its differences from disinfection-Thermal resistance of micro-organisms. Detailed study of the following sterilization process.
 - (i) Sterilization with moist heat.
 - (ii) Dry heat sterilization,
 - (iii) Sterilization by radiation.
 - (iv) Sterilization by filtration and
 - (v) 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 equipments.
14. 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. Tablets coating-Sugar coating; Film coating, enteric coating and microencapsulation (Tablets coating may be dealt in an elementary manner.)
 15. Processing of Capsules-hard and soft gelating capsules; different sizes capsules; filling of capsules; handling and storage of capsules, special applications of capsules.
 16. Study of immunological products like sera vaccine toxoids & their preparations.

PHARMACEUTICAL CHEMISTRY-I

1. General discussion on the following inorganic compounds including important physical and chemical properties, medicinal and Pharmaceutical uses, storage conditions and chemical incompatibility.
 - (A) Acids, bases and buffers Boric acid*, Hyd- rochloric acid, strong ammonium hydroxide, Calcium hydroxide, Sodium hydroxide and official buffers.
 - (B) Antioxidants-Hypophosphorous acid, Sulphur dioxide, Sodium bisulphite, Sodium metabisulphite, Sodium thiosulphate, Nitro- gen and Sodium Nitrite.
 - (C) Gastrointestinal agents-
 - (i) Acidifying agents Dilute hydrochloric acid.
 - (ii) Antacids-Sodium bicarbonate, Aluminium hydroxide gel, Aluminium Phosphate, Calcium carbonate, Magnesium carbonate, Magnesium trisilicate, Magnesium oxide. Combinations of antacid preparations.
 - (iii) Protectives and Adsorbents-Bismuth subcarbonate and Kaolin.
 - (iv) Saline Cathartics-Sodium Potassium tartrate and Magnesium sulphate.

- (D) Topical Agents-
- (i) Protectives-Talc, Zinc Oxide, Calamine, Zinc stearate. Titanium dioxide. Silicone poly- mers.
 - (ii) 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.
 - (iii) Sulphur and its compounds-Sublimed sulphur precipitated sulphur, selenium sulphide.
 - (iv) Astringents:-Alum and Zinc Sulphate.
- (E) Dental Products-Sodium Fluoride, Stannous Fluoride, Calcium carbonate, Sodium metaphosphate, Dicalcium phosphate, Strontium chloride, Zinc chloride.
- (F) Inhalants-Oxygen, Carbon dioxide, Nitrous oxide.
- (G) Respiratory stimulants-Ammonium Carbonate
- (H) Expectorants and Emetics-Ammonium chloride," Potassium iodide, Antimony Potassium tartrate.
- (I) Antidotes-Sodium nitrate.
2. Major Intra and Extracellular electrolytes-
- (A) Electrolytes used for replacement therapy- -Sodium chloride and its preparations, Potassium chloride and its preparations.
 - (B) 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.
 - (C) Combination of oral electrolyte powders and solutions.
3. Inorganic Official compounds of Iron, Iodine, and Calcium Ferrous Sulfate and Calcium gluconate.
4. Radio pharmaceuticals and Contrast media-Radio activity-Alpha. Beta and Gamma Radiations, Biological effects of radiations, Measurement of radio activity, G. M. Counter Radio isotopes- their uses, storage and precautions with special reference to the official preparations.
Radio opaque Contrast media-Barium sulfate.
5. Quality control of Drugs and Pharmaceuticals- Importance of quality control, significant errors, methods used for quality control, sources of impurities in Pharmaceuticals. Limit tests for Arsenic, chloride, sulphate, Iron and Heavy metals.
6. Identification tests for cations and anions as per Indian Pharmacopoeia

PHARMACOGNOSY

1. Definition, History and scope of Pharmacognosy including indigenous system of medicine.
2. Various systems of classification of drugs of natural origin.
3. Adulteration and drug evaluation; significance of Pharmacopoeial standards.
4. Brief outline of occurrence, distribution, outline of isolation, identification tests, therapeutic effects and pharmaceutical applications of alkaloids, terpenoids, glycosides, volatile oils, tannins and resins.
5. Occurrence, distribution, organoleptic evaluation, chemical constituents including tests wherever applicable and therapeutic efficacy of following categories of drugs.
 - (a) Laxatives : Aloes, Rhubarb, Castor oil, Ispaghula, Senna.
 - (b) Cardiotonics - Digitalis, Arjuna.
 - (c) Carminatives & G.I. regulators - Umbelliferous fruits, Coriander, Fennel, Ajowan, Cardamom Ginger, Black pepper, Asafoetida, Nutmeg, Cinnamon, Clove.
 - (d) Astringents-Catechu.
 - (e) Drugs acting on nervous system-Hyoseyamus, Belladonna, Aconite, Ashwagandha, Ephedra, Opium, Cannabis, Nux vomica.
 - (f) Antihypertensives - Rauwolfia.
 - (g) Antitussives - Vasaka, Tolu balsam Tulsi
 - (h) Antirheumatics - Guggul, Colchicum
 - (i)
 - (j) Antileprotics - Chaulmoogra Oil.
 - (k) Antidiabetics - Pterocarpus, Gymnema, Sylvestro.
 - (l) Diuretics - Gokhru, Punarnava.
 - (m) Antidysentrics - Ipecacuanha
 - (n) Antiseptics and disinfectants Benzoin, Myrrh, Nim, curcuma.
 - (o) Antimalarials - Cinchona
 - (p) Oxytocics-Ergot.
 - (q) Vitamines - Shark liver Oil and Amla.
 - (r) Enzymes-Papaya, Diastase, Yeast.
 - (s) Perfumes and flavouring agents - peppermint Oil, Lemon Oil, Orange Oil, Lemon grass Oil, Sandalwood.
 - (t) Pharmaceuticals aids - Hone, Arachis Oil, Starch, Kaolin, Peetin, Olive Oil, Lanolin, Beeswax, Acacia, Tragacanth, Sodium alginate, Agar, Guar gum, gelatin.
 - (u) Miscellaneous-Liquorice, Garlic, Picrorhiza, Dioscorea, Linseed, Shatavari, Shankhapushpi, Pyrethrum, Tobacco.
6. Collection and preparation of crude drug for the market as exemplified by Ergot, opium, Rauwolfia, digitalis, senna.
7. Study of source, preparation and identification of fibres used in sutures and surgical dressings - cotton, sild, wool and regenerated fibre.
8. Gross anatomical studies of Senna, Datura, Cinnamon, Cinchona, fennel, Clove, ginger, Nuxvomica & Ipecacuanha.

BIOCHEMISTRY AND CLINICAL PATHOLOGY

1. Introduction to biochemistry.
2. Brief chemistry and role of proteins, polypeptides and amino acids classification, Qualitative tests, Biological Value. Deficiency diseases.
3. Classification, qualitative tests. Diseases related to carbohydrate metabolism.
4. Brief chemistry and role of Lipids, Classification, qualitative tests. Diseases related to lipids metabolism.
5. Brief chemistry and role of Vitamins and Coenzymes.
6. Role of minerals and water in life processes.
7. Enzymes : Brief concept of enzymic action. Factors affecting it. Therapeutic and pharmaceutical importance.
8. Brief concept of normal and abnormal metabolism of proteins, carbohydrates and lipids.
9. Introduction to pathology of blood and urine.
 - (a) Lymphocytes and Platelets, their role in health and disease.
 - (b) Erythrocytes Abnormal cells and their significance.
 - (c) Abnormal constituents of urine and their significance in diseases.

HUMAN ANATOMY PHYSIOLOGY

1. Scope of Anatomy and Physiology. Definition of various terms used in Anatomy
2. Structure of cell, function of its components with special reference to mitochondria and microsomes.
3. Elementary tissues of the body. i.e. epithelial tissue, muscular tissue, connective tissue and nervous tissue.
4. Structure and function of skeleton. Classification of joints and their function, Joint disorder.
5. Composition of blood, functions of blood elements. Blood group and coagulation of blood. Brief information regarding disorders of blood.
6. Name and functions of lymph glands.
7. Structure and functions of various parts of the heart. Arterial and venous system with special reference to the names and positions of. main arteries and veins. Blood pressure and its recording. Brief information about cardiovascular disorders.
8. Various parts of respiratory system and their functions. Physiology of respiration.
9. Various parts of urinary system and their functions, structure and functions of kidney. Physiology of Urine formation. Pathophysiology of renal diseases and oedema.
10. Structure of skeletal muscle. Physiology of muscle contraction. Names, position, attachments and functions of various skeletal muscles. Physiology of neuromuscular junction.
11. Various parts of central nervous system, brain and its parts, functions and reflex action. Anatomy and Physiology of autonomic nervous system.
12. Elementary knowledge of structure and functions of the organs of taste, smell, ear, eye and skin. Physiology of pain.
13. Digestive system; names of the various parts of digestive system and their functions. Structure and functions of "liver", physiology of digestion and absorption.
14. Endocrine glands and Hormones. Locations of the glands, their hormones and functions. Pituitary, thyroid, Adrenal and Pancreas.
15. Reproductive system - Physiology and Anatomy of Reproductive system.

HEALTH EDUCATION AND COMMUNITY PHARMACY

1. Concept of Health-Definition of physical health, mental health, Social health, spiritual health determinates of health, indicators of health, concept of disease, natural history of diseases, the disease agents, concept of prevention of diseases.
2. Nutrition and health-Classification of foods requirements, disease induced due to deficiency of proteins, Vitamins and minerals-treatment and prevention.
3. 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
4. First aid-Emergency treatment in shock, snake-bite, burns poisoning, heart disease, fractures and resuscitation methods. Elements of minor surgery and dressings.
5. Environment and health-Sources of water supply, water pollution, purification of water, health and air, noise light-solid waste disposal and control-medical entomology, arthropod borne diseases and their control, rodents, animals and diseases.
6. Fundamental principles of microbiology classification of microbes, isolation, staining techniques of organisms of common diseases.
7. Communicable diseases-Causative agents modes of transmission and prevention.
 - (a) Respiratory infections-Chicken pox, measles Influenza, diphtheria, whooping cough and tuberculosis.
 - (b) Intestinal infections: poliomyelitis, Hepatitis Cholera. Typhoid. Food poisoning, Hook-worm infection.
 - (c) Arthropod borne infections-plague, Malaria, Filariasis.
 - (d) Surface infections-Rabies, Trachoma, Tetanus, Leprosy.
 - (e) Sexually transmitted diseases-Syphilis, Gonorrhoea, AIDS.
8. Non-communicable diseases-Causative agents prevention care and control cancer, Diabetes, Blindness, Cardiovascular diseases.
9. Epidemiology-Its scope, methods, uses, dynamics of disease transmission. Immunity and immunization: Immunological products and their dose schedule. Principles of disease control and prevention, hospital acquired infection, prevention and control. Disinfection, types of disinfection, disinfection procedures, for faces, urine, sputum, room linen dead-bodies, instruments.

विषय खण्ड-(II)**PHARMACEUTICS II**

1. Dispensing Pharmacy:
 - (i) Prescriptions-Reading and understanding of prescription; Latin terms commonly used (Detailed study is not necessary), Modern methods of prescribing, adoption of metric system. Calculations involved in dispensing.
 - (ii) Incompatibilities in Prescriptions - Study of various types of incompatibilities - physicals, chemical and therapeutic.
 - (iii) Posology - Dose and Dosage of drugs, Factors influencing dose, Calculations of doses on the basis of age, sex and surface area. Veterinary doses.
2. Dispensed Medications:

(Note : A detailed study of the following dispensed medication is necessary. Methods of preparation with theoretical and practical aspects, use of appropriate containers and closures, Special labeling requirements and storage conditions should be high-lighted).

 - (i) Powders-Types of powders-Advantages and disadvantages of powders, Granules, Cachets and Tablet triturates. Preparation of different types of powders encountered in prescriptions. Weighing methods, possible errors in weighing, minimum weighable amounts and weighing of material below the minimum weighable amount, geometric dilution and proper usage and care of dispensing balance.
 - (ii) Liquid Oral Dosage Form:
 - (a) Monophasic - Theoretical aspects including commonly used vehicles, essential adjuvant like stabilizers, colourants and flavours, with examples.

Review of the following monophasic liquids with details of formulation and practical methods.

Liquids for Internal
Administration

Liquids for external
administration or used
on mucus membranes.

Mixtures and concentrates
Syrups

Gargles
Mouth washes
Throat-paints
Douches

Elixirs

Ear Drops
Nasal drops & Sprays
Liniments
Lotions.

- (b) Biphasic Liquid Dosage Forms:
 - (i) Suspensions (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.
 - (ii) Emulsions-Types of emulsions, identification of emulsion system, formulation of emulsions, selection of emulsifying agents. Instabilities in emulsions. Preservation of emulsions.
 - (iii) Semi-Solid Dosage Forms:
 - (a) 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.
 - (b) Pastes-Deference between ointments and pastes, bases of pastes. Preparation of pastes and their preservation.
 - (c) Jellies-An introduction to the different types of jellies and their preparation.
 - (d) An elementary study of poultice.
 - (e) 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.
 - (iv) Dental and Cosmetic Preparations: Introduction to Dentrificcs , Facial cosmetics. Deodorants, Antiperspirants, Shampoos, Hair dressings and Hair removers.
 - (v) Sterile Dosage Forms:
 - (a) 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.
 - (b) Sterility testing, Particulate matter monitoring - Faulty seal packaging.
 - (c) Ophthalmic Products-Study of essential characteristics of different ophthalmic preparations. Formulation additives, special precautions in handling and storage of ophthalmic products.

PHARMACEUTICAL CHEMISTRY II.

- Introduction to the nomenclature of organic chemical systems with particular reference to heterocyclic system containing up to 3 rings.
- The Chemistry of following Pharmaceutical organic compounds, covering their nomenclature, chemical structure, uses and the important Physical and Chemical properties (Chemical structure of only those compounds marked with asterisk(*)). The stability and storage conditions and the different type of Pharmaceutical formulations of these drugs and their popular brand names.

Antiseptics and Disinfectants - Proflavine*, Benzal- koniumchloride, Cetrinide, Chlorocresol*, Chloroxylene. Formaldehyde solution, Hexachlorophene , Liquified phenol, Nitrofurantoin.

Sulfonamides-Sulfadiazine, Sulfaguanidine*,

Phthalylsulfathiazole , Succinylsulfathiazole, fadimethoxine , sulfamethoxypridazine, methoxazole. co-trimoxazole. Sulfacetamide*

Antileprotic Drugs-Clofazimine , Thiambutosine. Dapsone*, Solapsone.

Anti-tubercular Drugs-Isoniazid*. PAS* Streptomycin, Rifampicin, ethambutol*, Thiacetazone, Ethionamide, cycloserine, Pyrazinamide*

Antiamoebic and Anthelmintic Drugs-EmetineMetronidazole* Halogenated, Hydroxyquinolines, diloxanidefuxroate, paramomycin piperazine*, Mebendazole, D.E.C.*

Antibiotics- Benzyle Penicillin*, Phenoxy methyl Penicillin*. Benzathine penicillin, Ampicillin* Cloxacillin, Carbenicillin, Gentamicin, Neomycin, Erythromycin, Tetracycline, Cephalcxin, Cephaloridine Cephalothin, Griseofulvin, Chloramphenicol.

Antifungal agents-Undecylenic acid, Tolnaftate Nystatin, Amphotericin, Hamycin.

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

Tranquilizers-Chlorpromazine* Prochlorperazine, Trifluoperazine Thiethixene, Haloperidol*

Triperiod, Oxypertine, Chlordiazepoxide, Diazepam* Lorazepam, Memprobamate.

Hypnotics- Phenobarbitone*, Butobarbitone, Cyclobarbitone, Nitrazepam, Glutethimide, Meghyprylone, Paraldehyde, Triclofos sodium.

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

Antidepressant Drugs-Amitriptyline, Nortriptyline, Imipramine* Phenelzine, Tranylcpromine.

Analeptics-Theophylline, Caffeine*. Coramine* Dextroamphetamine.

Adrenergic Drugs-Adrenaline* Noradrenaline, Isoprenaline*, Phenylephrine, Salbutamol, Terbutaline, Ephedrine*, Pseudoephedrine.

Adrenergic Antagonist- Tolazoline, Propranolol*, Practolol.

Cholinergic Drugs- Neostigmine*, Pyridostigmine pralidoxime, Pilocarpine, Physostigmine*

Cholinergic Antagonists-Atropine* Hyoscine, Homatropine, Propantheline*, Benztropine Tropicamide, Biperiden.*

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

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

Hypoglycemic Agents-Insulin, Chlorpropamide*,

Tolbutamide, Glibenclamide, Pheformin*, Metformin.

Coagulants and Anti Coagulants-Heparin thrombin Menadione*, Bishydroxycoumarin, Warfarin Sodium.

Local Anaesthetics-Lignocaine*, Procaine Benzocaine.

Histaminic and Anti-Histaminic Agents-Histamine, Diphenhydramine*, Promethazine, Cyproheptadine, Mephyramine, Pheniramine, Chlorpheniramine*.

Analgesics and Anti pyretics morphin phethidine*, Codeine, Meghadone Aspirin* Paracetamol*, Analgin, Dextropropoxyphene, Pentazocine.

Non-steroidal anti-inflammatory Agents indomethacin*, Phenylbutazone*, Oxyphenbutazone, Ibuprofen, Thyroxine and Antithyroids Thyroxinem, Methimazole, Methylthiouracil Propylthiouracil.

Diagnostci Agents-Iopanoic Acid, Propyliodone, Sulfobromophthalcin.

Sodium Indigotindisulfonate, Indigo Carmine, Evansblue, Congo Red, Fluorescein sodium.

*Anticonvuslants, Cardiac glycosides, Antiarrhythmic antihypertensives & vitamins.

Steroidal Drugs Betamethazone, Cortisone, Hydrocortisone, Prednisolone, Progesterone, Testosterone, Oestradiol Nandrolone.

Anti-Neoplastic Drugs-Actinomycins, Azathioprine, Busulphan, Chlorambucil, Cisplatin cyslophosphamide, Daunorubicin hydrochloride, Fluorouracil, Mercaptopurine, Methotrexate, Mytomycin.

PHARMACOLOGY & TOXICOLOGY

1. Introduction to Pharmacology, scope of Pharmacology.
2. Routes of administration of drugs, their advantages and disadvantages.
3. Various processes of absorption of drugs and the factors affecting them, Metabolism, distribution and excretion of drugs.
4. General mechanism of drugs action and the factors which modify drug action.
5. Pharmacological classification of drugs. The discussion of drugs should emphasize the following aspect:
 - (i) Drugs acting on the Central Nervous System:
 - (a) General anaesthetics, adjunction to anesthesia, intravenous anaesthetics.
 - (b) Analgesic antipyretics and non-steroidal anti-inflammatory drugs, Narcotic analgesics, Antirheumatic and antigout re- medics, Sedatives and Hypnotics, Psychopharmacological agents, anti convul- sants, analeptics.
 - (c) Centrally acting muscle relaxants and anti- parkinsonism agents.
 - (ii) Local anaesthetics.
 - (iii) Drug acting on autonomic nervous system.
 - (a) Cholinergic drug, Anticholinergic drugs, anti- cholinesterase drugs.
 - (b) Adrenergic drugs and adrenergic receptor blockers.
 - (c) Neurone blockers and ganglion blockers,
 - (d) Neuromuscular blockers, drugs used in myas- thenia gravis.
 - (iv) Drugs acting on eye, mydriatics, drugs used in glaucoma.
 - (v) Drugs acting on respiratory system-Respiratory stimulants, Bronchodilators, Nasal decongestants, Expectorants and Antitussive agents
 - (v) Antacids, Physiological role of ;histamine'and serotonin, Histamine and Antihistamines, Prostaglandins.
 - (vii) Cardio Vascular drugs, Cardiotonics, Antiarrhythmic agents, Antianginal agents. Antihypertensive agents, Peripheral Vasodilators and drugs used in atherosclerosis.
 - (viii) Drugs acting on the blood and blood forming organs. Haematines, Coagulants and anti-coagulants, Haemostatics, Blood substitutes and plasma expanders.
 - (ix) Drugs affecting renal function-Diuretics and antidiuretics.
 - (x) Hormones and hormone antagonists-hypog- lycaemic agents, Antithyroid drugs, sex hormones and oral contraceptives, corti costeroids.
 - (xi) Drugs acting on digestive system-Car- minatives, digestants Bitters, Antacids and drugs used in Peptic ulcer, purgatives, and laxatives, Antidiarrhoeals, Emetics, Anti- emetics, Anti-spasmodics.

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

 7. Chemotherapy of protozoal diseases. Anthelmintic drugs.
 8. Chemotherapy of cancer.
 9. Disinfectants and antiseptics.

A detailed study of the action of drugs on each organ is not necessary.

PHARMACEUTICAL JURISPRUDENCE

1. Origin and nature of Pharmaceutical legislation in India, its scope and objectives. Evolution of the "Concept of Pharmacy" as an integral part of the Health Care System.
2. Principles and significance of Professional Ethics. Critical study of the Code of Pharmaceutical Ethics drafted by Pharmacy Council in India.
3. Pharmacy Act, 1948-The General study of the Pharmacy Act with special reference to Education Regulations, working of State and Central Councils, constitutions of these councils and functions, Registration procedures under the Act.
4. The Drugs and Cosmetics Act, 1940-General study of the Drugs and Cosmetics Act and 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 licenses 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 labeling and storage condition of drugs.
5. The Drugs and Magic Remedies (Objectionable Advertisement) Act, 1954-General Study of the Act Objectives, special reference to be laid on Advertisements. Magic remedies and objectionable and permitted advertisements - disease which cannot be claimed to be cured.
6. Narcotic Drugs and Psychotropic Substances Act, 1985-A brief study of the act with special reference to its objectives, offences and punishment.
7. Brief introduction to the study of the following acts.
 - i. Latest Drugs (Price Control) Order in force.
 - ii. Poisons Act 1919 (as amended to date)
 - iii. Medicinal and Toilet Preparations (Excise Duties) Act, 1955 (as amended to date)
 - iv. Medical Termination of Pregnancy Act, 1971 (as amended to date)

DRUG STORE AND BUSINESS MANAGEMENT

Part-I Commerce

1. Introduction-Trade, Industry and Commerce, functions and subdivision of Commerce, Introduction to Elements of Economics and Management.
2. Forms of Business Organisations.
3. Channels of Distribution.
4. Drug House Management - Selection of Site, Space lay-out and legal requirements. Importance and objectives of Purchasing, selection of suppliers, credit information, tenders, contracts and price determination and legal requirements thereto. Codification, handling of drug stores and other hospital supplies.
5. Inventory control-objects and importance, modern techniques like ABC, VED analysis, the lead time, inventory carrying cost, safety stock, minimum and maximum stock levels, economic order quantity, scrap and surplus disposal.
6. Sales Promotion, Market Research, Salesmanship, qualities of a salesman, Advertising and Window Display.
7. Recruitment, training, evaluation and compensation of the pharmacist.
8. Banking and Finance Service and functions of bank. Finance Planning and sources of finance.

Part-II Accountancy

1. Introduction to the accounting concepts and conventions, Double entry Book keeping, Different kinds of accounts.
2. Cash Book.
3. General Ledger and Trial Balance.
4. Profit and Loss Account and Balance Sheet.
5. Simple technique of analyzing financial statements.

Introduction to budgeting.

HOSPITAL AND CLINICAL PHARMACY

Part-I : Hospital Pharmacy:

1. Hospital Definition, Function, Classifications based on various criteria, organization, Managements and Health delivery system in India.
2. Hospital Pharmacy:
 - (a) Definition
 - (b) Functions and objectives of Hospital Pharmaceutical services.
 - (c) Location, Layout, Flow chart of material and men.
 - (d) Personnel and facilities requirements including equipments based on individual and basic needs.
 - (e) Requirements and abilities required for Hospital pharmacists.
3. Drug Distribution system in Hospitals:
 - (a) Out-patient services
 - (b) In-patient services-(a) types of services (b) detailed discussion of Unit Dose system, Floor ward stock system, Satellite pharmacy services, Central sterile services, Bed Side Pharmacy.
4. Manufacturing:
 - (a) Economical considerations, estimation of demand.
 - (b) Sterile manufacture-large and small volume parenterals, facilities, requirements, layout production planning, man-power requirements.
 - (c) Non-sterile manufacture-Liquid orals; externals-bulk concentrates.
 - (d) Procurement of stores and testing of raw materials.
5. Nomenclature and uses of surgical instruments and Hospital Equipments and health accessories.
6. P.T.C. (Pharmacy Therapeutic Committee), Hospital Formulary System and their organisation. functioning, composition.
7. Drug Information service and Drug Information Bulletin.
8. Surgical dressing like cotton, gauze, bandages and adhesive tapes including their pharmacopocial tests for quality. Other hospital supply e.g. I. V. sets B.G. sets, Ryals tubes, Catheters. Syringes etc.
9. Application of computer in maintenance of records, inventory control, medication monitoring, drug information and data storage and retrieval in hospital and retail pharmacy establishments.

Part-II: Clinical Pharmacy:

1. Introduction to Clinical Pharmacy Practice-Definition, scope.
2. Modern dispensing aspects-Pharmacists and Patient counselling and advice for the use of common drugs, medication history.
3. Common daily terminology used in the Practice of Medicine.
4. Disease, manifestation and pathophysiology including salient symptoms to understand the disease like Tuberculosis, Hepatitis, Rheumatoid Arthritis, Cardiovascular diseases, Epilepsy, Diabetes, Peptic Ulcer, Hypertension.
5. Physiological parameters with their significance.
6. Drug Interactions:
 - (a) Definition and introduction.
 - (b) Mechanism of Drug Interaction.
 - (c) Drug-drug interaction with reference to analgesics, diuretics, cardiovascular drugs, Gastro intestinal agents, Vitamins and Hypoglycaemic agents.
 - (d) Drug-food interaction.

7. Adverse Drug Reactions:
 - (a) Definition and Significance.
 - (b) Drug-induced diseases and Teratogenicity.
8. Drugs in Clinical Toxicity-Introduction, general treatment of poisoning, systematic antidotes. Treatment of insecticide poisoning, heavy metal poison, Narcotic drugs, Barbiturate, Organophosphorus poisons.
9. Drug dependences, Drug abuse, addictive drugs and their treatment, complications.
10. Bio-availability of drugs, including factors affecting it.

विषय खण्ड-(III)

TECHNICAL ENGLISH :

1. Grammer and Comprehension :
 - a) Subject verb concord
 - b) Tense
 - c) Voice
 - d) Synthesis
 - e) Common errors
 - f) Vocabulary
 - g) Unseen passage to test language skills
2. Elementary Spoken English (Theory of Phonetics)
3. Sentance and paragraph writing
4. Report Writing :
 - a) Classification, Format and writing of reports
 - b) Mechanics of language
5. Technical Description of things and processes
6. Precis writing
7. Spoken English.
