SPECIALTY: PHARMACY TECHNOLOGY **(PHT)**

PAPER: CASE STUDY

Credit Value: 14
Objective/s of the paper: To assess student's knowledge, understanding and application of concepts and principles of pharmaceutical sciences Nature of the Exam: WRITTEN Format of the Exam:

Exam Paper	Option	Different sections of the paper	Duration per section	Mark allocated	Percentage
CASE STUDY	PHT	Pharmaceutics	60minutes	20	20
		Clinical Pharmacology	60 minutes	20	20
		Pharmacognosy	60 minutes	20	20
		Pharmaceutical Chemistry	60 minutes	20	20
		Hospital/community pharmacy practice	60 minutes	20	20
TOTAL MARK				100	100

STRUCTURE OF THE PAPER

PAPER	Different sections of the paper	Duration per section	Mark allocated	Percentage
CASE STUDY	SECTION A: Pharmaceutics (1 Case Study)	60 minutes	20	20
	SECTION B: Clinical Pharmacology (1 Case Study)	60 Minutes	20	20
	SECTION C: Pharmacognosy (1 Case Study)	60 Minutes	20	20
	SECTION D: Pharmaceutical Chemistry (1 Case Study)	60 Minutes	20	20

	SECTION A: Community/Hospital Pharmacy Practice (1 Case Study)	60 Minutes	20	20

CONTENTS OF THE DIFFERENT SECTIONS OF THE PAPER:

PHARMACEUTICS

- Introduction to pharmaceutics
- Pharmaceutical Calculations
- Introduction to Pharmaceutical Dosage Forms
- Pharmaceutical Packaging Material
- Pharmaceutical Additives and their applications.
- Size reduction and Size Separation
- Theory of mixing: solid-solid, solid-liquid, liquid-liquid and semisolid mixing
- Filtration, types of filter media, filter aids, and selection of filters
- Evaporation: Factors affecting evaporation, study of evaporating stills and evaporating pans, heat transferring evaporators, vapor compression evaporators and evaporation under reduced pressure. – Introduction to unit operation and pharmaceutical engineering
- Conveying of Solids Belt conveyors, chain conveyors, screw conveyors and pneumatic conveyors.
- Pharmaceutical Plant: Type of Materials
- Environmental Pollution and safety hazards
- Flow of fluids Fluid static and dynamics, basic equations, laws of conservation in fluid flow.
- Heat transfer Modes of heat transfer
- Distillation Theory of distillation, methods of distillation.
- Refrigeration and Air Conditioning
- Humidity: Determination methods, methods of increasing and decreasing humidity. Application of humidity control in pharmaceutical industries.
- Drying: Theory, principles and Methods
- Sterilization: Physical and Chemical Methods
- Crystallization Characterization of crystals and factors affecting them,
- Solid Dosage Forms: Powders, Granules, Tablets, Capsule (definition, type, Formulation)
- Parenteral Dosage Form: (Types, Formulation, Characteristics
- Surgical Products
- Packaging of Pharmaceutical Products
- organoleptic properties and their effect on formulation, stability and bioavailability.
- Liquid Dosage Forms: types, Formulation,
- Semisolid Dosage Forms: - Definitions, types,

- Pharmaceutical Aerosols: - Definition, formulation, packaging methods, pharmaceutical applications.
- Cosmetology and cosmetic Preparations: - Structure of skin, formulations

Clinical Pharmacology

- Chemotherapeutic Agents: General Principles of Chemotherapy,
- Antibacterial agents: Classification, (Penicillins, Cephalosporins, Macrolides, Aminoglycosides Sulfonamides, Tetracyclines,. Quinolones, Lincosamides, Chloramphenicol) Mode of Action, indication,
- Anti-fungal Agents: Azoles, Polyenes, Griseofulvine
- Anti-viral Agents: Anti-retroviral
- Anti-Parasitic Agents,Anti-Malarials, Anti-helminthes.
- Rational for multi-drug therapy or combination therapy in Malaria, leprosy, TB, HIV/AIDS

Cancer Chemotherapy:

- Nitrogen Mustards, Alkylating Agents, Vinca Alkaloids, Antimetabolites, Immunomodulator
  Endocrine System - Hypothalamic & pituitary hormones, Thyroid and Parathyroid hormones & Thyroid Drugs, Calcitonin & Vitamin D, hypoglycemic agents :Insulin, oral hypoglycemic agents& glucagon.
- ACTH & Corticosteroids, Androgens & anabolic steroids, Estrogens, Progesterone &Oral Contraceptives,
- Drugs acting on uterus: stimulants and relaxants
- Autonomic Nervous System
- Cholinergic receptors, cholinergic drugs (parasympathomimetics, cholinomimetics, anti-cholinesterase)., Anticholinergic drugs.
- Adrenoceptors, sympathomimetic, Adrenoceptors blockers. - Drugs action on autonomic ganglia (ganglionic stimulants, ganglion blocking agents).
- Neuromuscular blocking agents and centrally acting muscle relaxants.
- Autacoids - Histamine, Antihistaminic. – Serotonin (agonists and antagonists),
- Drugs in Ocular Pharmacology - Mydriatic and Mitotic agents, drugs used in glaucoma.

Drugs Acting on Central Nervous System:

- Sedatives, Hypnotics, Anxiolytics
- General anesthetics, local An aesthetics
- Anti-epileptics drugs
- Anti-Parkinson drugs
- Antipsychotic drugs
- CNS stimulants

Analgesics, Anti-inflammatory. Antipyretics

- Non-steroidal anti-inflammatory agents(NSAID)
- Opioid Analgesics
- Steroidal anti-inflammatory agents , Drugs for Gout

Narcotic analgesics: opioid derivatives.

Drugs Acting on Cardiovascular System Congestive heart failures drugs

- Antiarrhythmic drugs , Anti- Angina drugs Anti-hypertensive drugs. Anti-Diuretics Hypolipidemic drugs.
- Fibrinolysis agents.

Drugs Acting on Gastrointestinal System

- -Purgatives. - Antidiarrheal drugs, Emetics, Anti-emetics. Anti-Ulcer drugs, Anti-Spasmodic agents
- Drugs Acting on Respiratory System–
- Expectorants., Antitussives, bronchodilators & other antiasthmatics
- Drugs used in common cold & nasal decongestants

Drugs Acting on the Blood and Blood Forming Agents Coagulants, Anticoagulants.

- Fribrinolytics, Thrombolytic drugs
- Colloids and Crystalloids,
- Blood products and whole blood
- Hematinic (iron, vitamin B12 and Folic acid).
- Plasma expanders.

Vitamins and Minerals

Pharmacognosy

- Introductory Pharmacognosy: Historical development, modern concept and scope of Pharmacognosy
- Plant classification Plant nomenclature, taxonomy, Vegetative anatomy of plants
- Classification of crude drugs: Based on alphabetical, morphological, pharmacological, chemical and taxonomical methods, official and unofficial drugs, organized and unorganized drugs
- Crude drug: classification, Sources, Herbs, Animals, inorganic matter, plant tissue culture, marine
- Role of herbal drugs in national economy
- Cultivation of herbal drugs: Factors influencing variability in drug activity, type of soils, fertilizers, plant hormones and their applications, polyploidy, mutation and hybridization in medicinal plants.
- Production Factors: Preparation of herbal drugs for market

- Morphological and histological characters of crude
- Phytoconstituents of medicinal importance
- Principles of plant classification
- Techniques in microscopy
- Biosynthesis: Formation of primary and secondary metabolites.
- Resins: Study of plants containing Resins and Resin Combination
- Volatile oils : General methods of obtaining various types of volatile oils from plants
- Phytochemical constituents of medicinal plants : Active constituents, isolation, classification and properties with Qualitative chemical tests
- Herbarium: Preparation of herbarium sheets and their importance in authentication of plants
- Fibers: fibers used in pharmacy such as cotton, silk, wool, nylon and glass
- Tannins: Tannins & tannin containing drugs
- Drugs of Animal origins: Wool fat, lard, beeswax, honey, musk, lanolin, gelatin, etc.
- Enzymes- Biological sources, preparation, characters and uses
- Introduction to herbicides, fungicides, fumigants and rodenticides
- Carbohydrates: - Biological sources, chemical constituents, adulterants and uses
- Lipids: - Biological sources, chemical constituents, adulterants & uses
- Tannins - Biological sources, chemical constituents, chemical test and uses.
- Volatile oils - Biological sources, chemical constituents, adulterants and uses
- Resinous drugs - Classification, formation and chemical nature. Biological sources, chemical constituents, identification test, adulterants and uses
- Glycosides - Nature and classification. Biological sources, chemical constituents, adulterants and uses
- Alkaloids - Biological sources, chemical constituents, adulterants and uses
- Isolation Techniques - General methods used for the isolation and characterization
- Plant Biotechnology - Tissue culture, Nutritional requirements, Callus and suspension culture, production of secondary metabolites
- Biotransformation, immobilization of cells and enzymes. Gene transfer in plants, application of plant biotechnology
- Methods of adulteration - Deterioration of herbal drugs by insect.
- Evaluation of drugs by organoleptic, microscopic, physical, chemical and biological methods.
- WHO guidelines
- Quality control and Standardization of herbal drugs - Extractive values, ash values, chromatographic techniques for determination of chromatographic markers, spectroscopic techniques, assay methods
- Determination of heavy metals in herbal preparation and alcohol contents in Aristas and balsams.
- Quality control and rational use of herbal drugs as per WHO guidelines

- Traditional Medicine and some Herbal formulations - Principles involved in various practices
- Herbal cosmetics –Shampoos, Conditioners, Hair darkeners, Skin care
- Pharmacologically active drugs on the various systems of the body- Common names, sources, active constituents and uses

Pharmaceutical Chemistry

- Introduction: Definitions, evolution and scope of Pharmaceutical Chemistry
- Drug discovery, Design, development, Principles of drug discovery, sources of drug
- Physiochemical properties of drugs and drug action
- Stereochemistry and drug action: Optical, geometric and bioisosterism of drug molecules
- Drug-receptor interaction including transduction mechanism and drug receptor theory
- Inorganic pharmaceuticals: Physiological ions, electrolytes, physiological acids-base balance
- Essential and trace ions: Copper, zinc, iron, selenium, sulfur and iodine
- Gastro-intestinal agents: Acidifying agents, antacids, protective and absorbents, saline cathartics.
- Topical agents: Antimicrobials and astringents.
- Dental products: Anti-caries agents and dentifrices.
- Miscellaneous Inorganic Pharmaceutical agents: Inhalants; respiratory stimulants, expectorants and emetics, antidotes.

The cardiovascular system

- Cardiac glycosides and positive inotropic agents.
- Antiarrhythmic drugs. - Antihypertensive drugs
- Coronary vasodilators and drugs used in angina
- Hypolipidemic drugs
- Fribrinolytics agents Anti-hyperlipidemics Nitric oxide.
- Drugs Affecting the Central Nervous System - General anesthetics - sedative-hypnotics - anticonvulsants - antipsychotics - anxiolytics - antidepressants - hallucinogens – anti-Parkinson agents
- Opiate analgesics, non-opiate Analgesics: Non-steroidal antiinflammatory agents.
- Drugs Affecting the Peripheral Nervous System: Local anesthetics, skeletal muscle relaxants.
- Drugs Affecting the Autonomic Nervous System: Adrenergic agents, antiadrenergic agents, cholinergic agents, anticholinergic and antispasmodic agents, histamine and antihistamines
- Radiopharmaceuticals
- The hormonal system

Community/Hospital Pharmacy Practice

- Community/Hospital Pharmacy - Definition, functions and objectives of pharmacy. Establishment, personnel, space, equipment, apparatus and other facilities
- Pharmacy Layout facilities; procedures for procurement of drugs and supplies from medical stores depot, manufacturer, distributor, local market, procedure and limits of emergency purchase
- Role and Qualities of Pharmacist and Pharmacy Technician in Health Care delivery System
- Drug management Cycle
- Records, Documentation and Maintenance
- Medical prescriptions
- Drug dispensing: Prescription Only Medications (POM), Over the Counter (OTC)
- Substances of Abuse: Narcotics and dangerous drugs,
- Ward stock medicines and Emergency drugs
- Pharmacy Therapeutics Committee. - Constitution and functions Drug Information sources: primary, secondary, tertiary and quaternary.
- Extemporaneous preparations and Equipment pharmaceuticals in hospitals
- Pharmacists and patient counseling including specific examples
- Drug interactions of clinical important drugs - Introduction and Definitions - Mechanism of drug interactions, Drug - Drug Interactions with reference to Analgesics, Diuretics, Cardiovascular drugs, Gastrointestinal agents, Vitamins and Hypoglycemic drugs. Compliance to treatment and role of pharmacist
- Drugs in clinical toxicity. - General treatment of poisoning, - Systemic antidotes. - Treatment of poisoning due to insecticides, - Heavy metals, narcotics, barbiturates -

Organophosphorous compounds

PAPER: PHARMACEUTICS

Credit Value: 3
Objective/s of the paper: To assess student's knowledge, understanding and application of pharmaceutics concepts and principles. Nature of the Exam: WRITTEN Format of the Exam:

Exam Paper	Option	Different sections of the paper	Duration per section	Mark allocated	Percentage
PHARMACEUTICS	PHARMACY TECHNOLOGY	Pharmaceutics	03hrs	100	100
TOTAL MARK				100	100

STRUCTUR OF THE PAPER

Paper	Different Sections Of The Paper	Duration Per Section	Mark Allocated	Percentage
PHARMACEUTICS	Multiple Choice Questions (15)	30 minutes	15(1 X 15)	15
	STRUCTURAL QUESTIONS (10)	40 minutes	20 (2 X 10)	20
	SHORT ESSAY QUESTIONS (5)	50 Minutes	25 (5 X 5)	25
	LONG ESSAY QUESTIONS (2)	60 minutes	40 (2 X 20)	40

CONTENTS OF THE DIFFERENT SECTIONS OF THE PAPER:

PHARMACEUTICS I

- Introduction to pharmaceutics
- Pharmaceutical Calculations
- Introduction to Pharmaceutical Dosage Forms
- Pharmaceutical Packaging Material
- Pharmaceutical Additives and their applications.
- Size reduction and Size Separation
- Theory of mixing: solid-solid, solid-liquid, liquid-liquid and semisolid mixing
- Filtration, types of filter media, filter aids, and selection of filters
- Evaporation: Factors affecting evaporation, study of evaporating stills and evaporating pans, heat transferring evaporators, vapor compression evaporators and evaporation under reduced pressure. –

PHARMACEUTICS II

- Introduction to unit operation and pharmaceutical engineering
- Conveying of Solids Belt conveyors, chain conveyors, screw conveyors and pneumatic conveyors.
- Pharmaceutical Plant: Type of Materials
- Environmental Pollution and safety hazards
- Flow of fluids Fluid static and dynamics, basic equations, laws of conservation in fluid flow.
- Heat transfer Modes of heat transfer
- Distillation Theory of distillation, methods of distillation.
- Refrigeration and Air Conditioning
- Humidity: Determination methods, methods of increasing and decreasing humidity. Application of humidity control in pharmaceutical industries.
- Drying: Theory, principles and Methods
- Sterilization: Physical and Chemical Methods
- Crystallization Characterization of crystals and factors affecting them,

PHARMACEUTICS III

- Solid Dosage Forms: Powders, Granules, Tablets, Capsule (definition, type, Formulation)
- Parenteral Dosage Form: (Types, Formulation, Characteristics
- Surgical Products
- Packaging of Pharmaceutical Products

PHARMACEUTICS IV

- Organoleptic properties and their effect on formulation, stability and bioavailability.
- Liquid Dosage Forms: types, Formulation,
- Semisolid Dosage Forms: - Definitions, types,
- Pharmaceutical Aerosols: - Definition, formulation, packaging methods, pharmaceutical applications. Cosmetology and cosmetic Preparations: - Structure of skin, formulations

PAPER: CLINICAL PHARMACOLOGY

Credit Value: 2
Objective/s of the paper: To assess student's knowledge, understanding and application of clinical pharmacology concepts and principles. Nature of the Exam: WRITTEN Format of the Exam:

Exam Paper	Option	Different sections of the paper	Duration per section	Mark allocated	Percentage
CLINICAL PHARMACOLOGY	PHT	General Pharmacology	60minutes	30	30
		Clinical Pharmacology	120 minutes	70	70
TOTAL MARK				100	100

CONTENTS OF THE DIFFERENT SECTIONS OF THE PAPER

Paper	Different Sections Of The Paper	Duration Per Section	Mark Allocated	Percentage
CLINICAL PHARMACOLOGY	**SECTION A:** Multiple Choice Questions(15)	15 minutes	15 (1 X 15)	15
	SECTION B: STRUCTURAL QUESTIONS(10)	20 minutes	20 (2 X 10)	20
	SECTION C: SHORT ESSAY QUESTIONS(5)	35 Minutes	25 (5 X 5)	25
	SECTION D: LONG ESSAY QUESTIONS(2)	50 minutes	40 (2 X 20)	40
TOTAL		120 Minutes	100	100

General Pharmacology

- Definitions of basic terms and concepts
- Origin of drugs and drug development
- Pharmaceutical Dosage Forms
- Routes of Drug administration (Enteral, Parenteral, Topical)
- Drug prescription: Writing and interpretation of prescriptions
- Concepts of Dose, Dosage, Frequency, Precautions, Contraindication, Side Effects, Drug Interaction
- Measuring instruments for drug dispensing and administration

Dosage calculation: Pediatric dosage, Adults, Geriatrics.

Principles of Pharmacodynamics

- Principles of Pharmacokinetic (absorption, Distribution ,metabolism and Excretion)
- Drug regulation and distribution conditions
- Storage and monitoring
- Arrangement of drug cupboards
- Recognition of some common drugs
- Toxicology: Definition of poison, general principles of treatment of poisoning with particular reference to barbiturates, opioids, organophosphorous & atropine poisoning, Heavy metal Antagonists

Clinical Pharmacology I

- Chemotherapeutic Agents: General Principles of Chemotherapy,
- Antibacterial agents: Classification, (Penicillins, Cephalosporins, Macrolides, Aminoglycosides Sulfonamides, Tetracyclines,. Quinolones, Lincosamides, Chloramphenicol) Mode of Action, indication,
- Anti-fungal Agents: Azoles, Polyenes, Griseofulvine
- Anti-viral Agents: Anti-retroviral
- Anti-Parasitic Agents, Anti-Malarials, Anti-helminthes.
- Rational for multi-drug therapy or combination therapy in Malaria, leprosy, TB, HIV/AIDS

Cancer Chemotherapy:

- Nitrogen Mustards, Alkylating Agents, Vinca Alkaloids, Antimetabolites, Immunomodulators

Clinical Pharmacology II

Endocrine System - Hypothalamic & pituitary hormones, Thyroid and Parathyroid hormones & Thyroid Drugs, Calcitonin & Vitamin D, hypoglycemic agents :Insulin, oral hypoglycemic agents& glucagon.

- ACTH & Corticosteroids, Androgens & anabolic steroids, Estrogens, Progesterone &Oral Contraceptives,
- Drugs acting on uterus: stimulants and relaxants
- Autonomic Nervous System
- Cholinergic receptors, cholinergic drugs (parasympathomimetics, cholinomimetics, anti-cholinesterase)., Anticholinergic drugs.
- Adrenoceptors, sympathomimetic, Adrenoceptors blockers. - Drugs action on autonomic ganglia (ganglionic stimulants, ganglion blocking agents). Neuromuscular blocking agents and centrally acting muscle relaxants.
- Autacoids - Histamine, Antihistaminic. – Serotonin (agonists and antagonists),
- Drugs in Ocular Pharmacology - Mydriatic and Mitotic agents, drugs used in glaucoma.

Clinical Pharmacology III

Drugs Acting on Central Nervous System:

- Sedatives, Hypnotics, Anxiolytics
- General anesthetics, local An aesthetics
- Anti-epileptics drugs
- Anti-Parkinson drugs
- Antipsychotic drugs
- CNS stimulants

Analgesics, Anti-inflammatory. Antipyretics

- Non-steroidal anti-inflammatory agents(NSAID)
- Opioid Analgesics
- Steroidal anti-inflammatory agents ,
- Drugs for Gout

Narcotic analgesics: opioid derivatives.

Drugs Acting on Cardiovascular System

Congestive heart failures drugs

- Antiarrhythmic drugs , Anti- Angina drugs Anti-hypertensive drugs.
- Anti-Diuretics Hypolipidemic drugs.
- Fibrinolysis agents.

Clinical Pharmacology IV

Drugs Acting on Gastrointestinal System

- -Purgatives. - Antidiarrheal drugs, Emetics, Anti-emetics. Anti-Ulcer drugs, Anti-Spasmodic agents
- Drugs Acting on Respiratory System–
- Expectorants., Antitussives, bronchodilators & other antiasthmatics
- Drugs used in common cold & nasal decongestants

Drugs Acting on the Blood and Blood Forming Agents

Coagulants, Anticoagulants.

- Fribrinolytics, Thrombolytic drugs

Colloids and Crystalloids,

- Blood products and whole blood
- Hematinic (iron, vitamin B12 and Folic acid).
- Plasma expanders.Vitamins and Minerals

PAPER: PHARMACOGNOSY

Credit Value: 3

Objective/s of the paper: To assess student's knowledge, understanding and application of the concepts and principles of pharmacognosy. Nature of the Exam: WRITTEN Format of the Exam:

Exam Paper	Option	Different sections of the paper	Duration per section	Mark allocate d	Percentage
PHARMACOGNOSY	PHARMACY TECHNOLOGY	PHARMAC OGNOSY	120minute s	100	100
TOTAL MARK				100	100

STRUCTURE OF THE PAPER:

Paper	Different Sections Of The Paper	Duration Per Section	Mark Allocated	Percentage
PHARM ACOGN OSY	**SECTION A:** Multiple Choice Questions (15)	15 minutes	15 (1 X 15)	15
	SECTION B: STRUCTURAL QUESTIONS (10)	20 minutes	20 (2 X 10)	20
	SECTION C: SHORT ESSAY QUESTIONS (5)	35 Minutes	25 (5 X 5)	25
	SECTION D: LONG ESSAY QUESTIONS (2)	50 minutes	40 (2 X 20)	40

CONTENTS OF THE DIFFERENT SECTIONS OF THE PAPER:

Pharmacognosy I

- Introductory Pharmacognosy: Historical development, modern concept and scope of Pharmacognosy
- Plant classification Plant nomenclature, taxonomy, Vegetative anatomy of plants
- Classification of crude drugs: Based on alphabetical, morphological, pharmacological, chemical and taxonomical methods, official and unofficial drugs, organized and unorganized drugs
- Crude drug: classification, Sources, Herbs, Animals, inorganic matter, plant tissue culture, marine

- Role of herbal drugs in national economy
- Cultivation of herbal drugs: Factors influencing variability in drug activity, type of soils, fertilizers, plant hormones and their applications, polyploidy, mutation and hybridization in medicinal plants.
- Production Factors: Preparation of herbal drugs for market
- Morphological and histological characters of crude
- Phytoconstituents of medicinal importance
- Principles of plant classification
- Techniques in microscopy

Pharmacognosy II

- Biosynthesis: Formation of primary and secondary metabolites.
- Resins: Study of plants containing Resins and Resin Combination
- Volatile oils : General methods of obtaining various types of volatile oils from plants
- Phytochemical constituents of medicinal plants : Active constituents, isolation, classification and properties with Qualitative chemical tests
- Herbarium: Preparation of herbarium sheets and their importance in authentication of plants
- Fibers: fibers used in pharmacy such as cotton, silk, wool, nylon and glass
- Tannins: Tannins & tannin containing drugs
- Drugs of Animal origins: Wool fat, lard, beeswax, honey, musk, lanolin, gelatin, etc.
- Enzymes- Biological sources, preparation, characters and uses
- Introduction to herbicides, fungicides, fumigants and rodenticides

Pharmacognosy III

- Carbohydrates: - Biological sources, chemical constituents, adulterants and uses
- Lipids: - Biological sources, chemical constituents, adulterants & uses
- Tannins - Biological sources, chemical constituents, chemical test and uses.
- Volatile oils - Biological sources, chemical constituents, adulterants and uses
- Resinous drugs - Classification, formation and chemical nature. Biological sources, chemical constituents, identification test, adulterants and uses
- Glycosides - Nature and classification. Biological sources, chemical constituents, adulterants and uses
- Alkaloids - Biological sources, chemical constituents, adulterants and uses

Pharmacognosy IV

- Isolation Techniques - General methods used for the isolation and characterization

- Plant Biotechnology - Tissue culture, Nutritional requirements, Callus and suspension culture, production of secondary metabolites
- Biotransformation, immobilization of cells and enzymes. Gene transfer in plants, application of plant biotechnology
- Methods of adulteration - Deterioration of herbal drugs by insect.
- Evaluation of drugs by organoleptic, microscopic, physical, chemical and biological methods.
- WHO guidelines
- Quality control and Standardization of herbal drugs - Extractive values, ash values, chromatographic techniques for determination of chromatographic markers, spectroscopic techniques, assay methods
- Determination of heavy metals in herbal preparation and alcohol contents in Aristas and balsams.
- Quality control and rational use of herbal drugs as per WHO guidelines
- Traditional Medicine and some Herbal formulations - Principles involved in various practices
- Herbal cosmetics –Shampoos, Conditioners, Hair darkeners, Skin care

Pharmacologically active drugs on the various systems of the body- Common names, sources, active constituents and uses

PAPER: PHARMACEUTICAL CHEMISTRY

Credit Value: 2
Objective/s of the paper: To assess student's knowledge, understanding and application of Pharmaceutical chemistry concepts, principles and application. Nature of the Exam: WRITTEN Format of the Exam:

Exam Paper	Option	Different sections of the paper	Duration per section	Mark allocated	Percentage
PHARMACEUTICAL CHEMISTRY	PHT	PHARMACEUTICAL CHEMISTRY	120minutes	100	100
TOTAL MARK				100	100

STRUCTURE OF THE PAPER

Paper	Different Sections Of The Paper	Duration Per Section	Mark Allocated	Percentage
PHARMACEUTICAL CHEMISTRY	SECTION A: Multiple Choice Questions (15)	15 minutes	15 (1 X 15)	15
	SECTION B: STRUCTURAL QUESTIONS (10)	20 minutes	20 (2 X 10)	20
	SECTION C: SHORT ESSAY QUESTIONS (5)	35 Minutes	25 (5 X 5)	25
	SECTION D: LONG ESSAY QUESTIONS (2)	50 minutes	40 (2 X 20)	40

CONTENTS OF THE DIFFERENT SECTIONS OF THE PAPER
Pharmaceutical Chemistry I

- Introduction: Definitions, evolution and scope of Pharmaceutical Chemistry
- Drug discovery, Design, development, Principles of drug discovery, sources of drug
- Physiochemical properties of drugs and drug action
- Stereochemistry and drug action: Optical, geometric and bioisosterism of drug molecules
- Drug-receptor interaction including transduction mechanism and drug receptor theory

- Inorganic pharmaceuticals: Physiological ions, electrolytes, physiological acids-base balance
- Essential and trace ions: Copper, zinc, iron, selenium, sulfur and iodine
- Gastro-intestinal agents: Acidifying agents, antacids, protective and absorbents, saline cathartics.
- Topical agents: Antimicrobials and astringents.
- Dental products: Anti-caries agents and dentifrices.
- Miscellaneous Inorganic Pharmaceutical agents: Inhalants; respiratory stimulants, expectorants and emetics, antidotes.

Pharmaceutical Chemistry III

The cardiovascular system

- Cardiac glycosides and positive inotropic agents.
- Antiarrhythmic drugs. - Antihypertensive drugs
- Coronary vasodilators and drugs used in angina
- Hypolipidemic drugs
- Fribrinolytics agents Anti-hyperlipidemics Nitric oxide.

Pharmaceutical Chemistry IV

- Drugs Affecting the Central Nervous System - General anesthetics - sedative-hypnotics - anticonvulsants - antipsychotics - anxiolytics - antidepressants - hallucinogens – anti-Parkinson agents
- Opiate analgesics, non-opiate Analgesics: Non-steroidal antiinflammatory agents.
- Drugs Affecting the Peripheral Nervous System: Local anesthetics, skeletal muscle relaxants.
- Drugs Affecting the Autonomic Nervous System: Adrenergic agents, antiadrenergic agents, cholinergic agents, anticholinergic and antispasmodic agents, histamine and antihistamines
- Radiopharmaceuticals
- The hormonal system

PAPER: PHARMACY PRACTICAL

Credit Value: 10
Objective/s of the paper: To assess student's practical knowledge, skills and competences in pharmacy practice
Nature of the Exam: Practical Format
of the Exam:

Exam Paper	Option	Different sections of the paper	Duration per section (Hour)	Mark allocated	Percentage
PHARMACY PRACTICAL	PHT	SECTION A: Pharmaceutics	1	40	40
		SECTION B: Clinical Pharmacology	1	30	30
		SECTION C: Hospital/Community Pharmacy practice	1	30	30
TOTAL MARK			3HRS	100	100

CONTENTS OF THE DIFFERENT SECTIONS OF THE PAPER:
Pharmaceutics Practical

- Extemporaneous preparation: Dosage forms
- Calculation, measurement, Preparation, Packaging and labeling

Clinical Pharmacology Practical

- Drug information from drug information sources, classification, generic and brand names,
- Indication, contraindications, dosage, side effects, interaction of various pharmacological classes of drugs

Hospital/Community Pharmacy practice

- Drug management cycle: procurement, preservation, inventory, dispensing Prescription: interpretation, filling, patient counselling.
- Dispensing: repackaging, labelling, extemporaneous preparations Documentation: types of pharmacy documents, uses and preservation.
- Administrative responsibilities.

PAPER: ANATOMY AND PHYSIOLOGY

Credit Value: 6
Objective/s of the paper: To assess student's knowledge and understanding of Anatomy-Physiology, Cell Biology, Histology and embryology
Nature of the Exam: written Format
of the Exam:

Exam Paper	Option	Different sections of the paper	Duration per section	Mark allocated	Percentage
ANATOMY& PHYSIOLOGY	PHARMACY TECHNOLOGY	Anatomy-Physiology I and II	120 minutes	80	80
		Cell Biology, Histology and Embryology	60 minutes	20	20
TOTAL MARK				100	100

STRUCTURE OF THE PAPER

PAPER	Different sections of the paper	Duration per section	Mark allocated	Percentage
ANATOMY & PHYSIOLOGY	SECTION A: Multiple Choice Questions (15)	30 minutes	15 (1 X 15)	15
	SECTION B: STRUCTURAL QUESTIONS (10)	40 minutes	20 (2 X 10)	20
	SECTION C: SHORT ESSAY QUESTIONS(5)	50 Minutes	25(5 X 5)	25
	SECTION D: LONG ESSAY QUESTIONS (2)	60 minutes	40(2 X 20)	40

CONTENTS OF THE DIFFERENT SECTIONS OF THE PAPER:
Anatomy-Physiology I Nervous System:

- Organization of the nervous system: Central Nervous System, Peripheral Nervous System (Autonomic Nervous System)
- Organization of the Central Nervous System: spinal cord, medulla oblongata, brain, meninges and CSF; Cranial nerves, plexus;
- Physiology of the central nervous system: nervous influx, transmission of the influx (chemical mediators, synapse, driving plate), arc reflex;
- Somatic and Autonomic nervous systems: Organization, Anatomy and Functioning

Endocrine System:

- Pancreas; - Thyroid: anatomy - Histology - physiology; - Parathyroid: anatomy

physiology, metabolism of calcium;

- Adreno- Hypothalamic-Pituitary axis and Hormones
- Sense Organs: The eye: vision; - The ear: hearing and balance; - Smell: Taste; Touch.

Digestive System:

- The Digestive Tract
- Functions of organs of the Digestive System, Digestive Enzymes, Food Absorption and Elimination Anatomy-Physiology

II

Cardiovascular System:

- Organization and Functioning
- The Heart – Anatomy and functioning of the heart,
- Blood vessels - Anatomy: arteries, veins and Capillaries
- Blood - The plasma and dissolved substances, hematopoiesis, hemolysis; Coagulation; Blood group.
- The Lymphatic System – lymphatic vessels and Lymph nodes Respiratory system:
- Anatomy - Upper airway nasal cavity, pharynx, larynx, trachea; - Bronchus, lungs, pleura, anatomy and histology. 2. Physiology of Breathing - Mechanisms for regulating nervous; - chemical phenomena.

Genito-urinary system:

- Structure and Physiology of The Kidney, Ureter, Bladder, Urethra
- Description anatomy and physiology of the genitalia of the Male and female.

Cell Biology, Histology and Embryology

- The cell: - Structure; - Multiplication; - Physiology
- The tissue: - Epithelial tissue; - Connective tissue; - Nervous tissue; - Concept of genetics.