

ignition, sublimation, fusion, calcination, adsorption, decantation, evaporation, vaporization, centrifugation, desiccation, levigation and trituration.

7. EXTRACTION PROCESSES:

- a. Maceration: Purpose & process.
- b. Percolation: Purpose and Process.
- c. Liquid-Liquid extraction: Purpose and Process.
- d. Large scale extraction: Purpose and Process.

8. RATE AND ORDER OF REACTIONS:

9. KINETIC PRINCIPLES AND STABILITY TESTING:

THEORETIC CONSIDERATIONS: (Degradation)

- a. Physical Factors: Influence of pH, temperature, ionic strength, acid-base catalysis, U.V. light.
- b. Chemical Factors: Complex chemical reactions. Oxidation-reduction reactions, Hydrolysis.

PHARMACEUTICS-I (PHYSICAL PHARMACY) (Practical)

Paper 09

Marks 100

NOTE: Practicals of the subject shall be designed from time to time on the basis of the above mentioned theoretical topics and availability of the facilities, e.g.

1. Experiments to demonstrate some of Physico-chemical processes like simple distillation, steam distillation, crystallization, dialysis.
2. Determination of Emulsion systems.
3. Determination of particle size.
4. Density, Specific Volume, Weights and Volumes of Liquids.
5. Preparation of Buffer solutions and isotonic solution.
6. Determination of %age composition of solutions by specific gravity method.
7. Partition-coefficient, surface tension, viscosity.

PHYSIOLOGY (Theory)

Paper 4

Marks 100

Course objective: After the completion of this course the students should be able to describe all the basic physiological processes which are the basis of pathophysiology of various diseases and their ultimate link with pharmacology for their treatment.

1. BASIC CELL FUNCTIONS:

- a. Chemical composition of the body: Atoms, Molecules, Ions, Free Radicals, Polar Molecules, Solutions, Classes of Organic Molecules
- b. Cell structure: Microscopic Observation of Cell, Microscopic, Cell Organelles, Cytoskeleton.
- c. Protein activity and cellular metabolism: Binding Site Characteristics, Regulation of Binding site Characteristics, Chemical Reactions, Enzymes, Regulation of Enzyme-Mediated Reactions, Multi-enzyme metabolic Pathways, ATP, Cellular Energy Transfer,

Carbohydrate, Fat, and Protein Metabolism, Essential Nutrients.

- d. Genetic information and Protein Synthesis: Genetic Code, Protein Synthesis, Protein, Degradation, Protein Secretion, Replication and Expression of Genetic Information, Cancer, Genetic Engineering.
- e. Movement of Molecules across Cell Membranes: Diffusion, Mediated- Transport Systems, Osmosis, Endocytosis and Exocytosis, Epithelial Transport.

2. BIOLOGICAL CONTROL SYSTEM:

- a. Homeostatic Mechanisms and Cellular Communication: General Characteristics, Components of Homeostatic Control Systems, Intercellular Chemical Messengers, Processes Related to Homeostasis, Receptors, single Transduction Pathways.
- b. Neural Control Mechanisms: Structure and Maintenance of Neurons, Functional Classes of Neurons, Glial Cells, Neural Growth and Regeneration, Basic Principles of Electricity, The resting Membrane Potential, Graded Potentials and Action Potentials, Functional Anatomy of synapses, Activation of the Postsynaptic Cell, Synaptic Effectiveness, Neurotransmitters and Neuro-modulators, Neuro-effector communication, Central Nervous System: Spinal Cord Central Nervous System: Brain, Peripheral Nervous System, Blood Supply, Blood-Brain Barrier phenomenon, and Cerebrospinal fluid.
- c. The Sensory Systems: Receptors, Neural Pathways in Sensory System, Association Cortex and Perceptual Processing, Primary Sensory Coding, Somatic Sensation, Visio, Hearing, Vestibular System, Chemical Senses.
- d. Principles of Hormonal Control Systems: Hormone Structures and Synthesis, Hormone Transport in the Blood, Hormone Metabolism and Excretion, Mechanisms of Hormone Action, Inputs that control Hormone Secretion, Control Systems Involving the Hypothalamus and Pituitary, candidate Hormones, type of Endocrine Disorders.
- e. Muscle: Structure, Molecular Mechanisms of Contraction, Mechanics of Single fiber Contraction, Skeletal Muscle Energy Metabolism, Types of Skeletal Muscle Fibers, Whole Muscle Contraction, Structure, Contraction and its Control.
- f. Control of Body Movement: Motor Control Hierarchy, Local control of Motor Neurons, The Brain Motor Centers and the Descending Pathways they Control, Muscle Tone, Maintenance of Upright Posture and Balance, Walking.
- g. Consciousness and Behavior: State of consciousness, conscious Experiences, Motivation and Emotion, Altered State of Consciousness, Learning and Memory, Cerebral Dominance and language Conclusion.

3. COORDINATED BODY FUNCTIONS:

- a. Circulation: Plasma, the Blood Cell, Pressure, flow and resistance, Anatomy, Heartbeat coordination, Mechanical Events of the Cardiac Cycle, The Cardiac output, Measurement of Cardiac Function, Arteries, Arterioles, Capillaries, veins, The Lymphatic system, Baroreceptor Reflexes, Blood Volume and Long term Regulation of Arterial Pressure, Other Cardiovascular Reflexes and Responses, Hemorrhage and Other Causes of Hypotension, the Upright Posture, Exercise, Hypertension, Heart Failure, Coronary Artery Disease and Heart Attacks, Formation of Platelet Plug, Blood coagulation: Clot Formation, Anticlotting systems, Anticlotting Drugs.

- b. Respiration: Organization of the Respiratory System, Ventilation and Lung Mechanics, Exchange of Gases in Alveoli and tissues, Transport of Oxygen in Blood, Transport of Carbon dioxide in Blood, Transport of Hydrogen ions between Tissues and Lungs, Control of Respiration, Hypoxia, Nonrespiratory Functions of the Lungs.
- c. The kidneys and Regulation of Water and Inorganic Ions: Renal Functions, Structure of the Kidneys and Urinary System, Basic Renal Process, The Concept of Renal Clearance Micturition, Total Body Balance of sodium and Water Basic Renal Process for sodium and Water, Renal Sodium Regulation, Renal Water regulation, A Summary Example: the response to Sweating, Thirst and Salt Appetite, Potassium Regulation, Effector Sites for Calcium Homeostasis, Hormonal controls, Metabolic Bone Disease, Source of Hydrogen Ion Gain or Loss, Buffering of Hydrogen Ions in the Body, Integration of Homeostatic Controls, Renal Mechanisms, Classification of Acidosis and Alkalosis, Diuretics, Kidney Disease.
- d. The Digestion and Absorption of Food (Overview): Functions of the Gastrointestinal Organs, Structure of the Gastrointestinal Tract Wall, Digestion and Absorption, Regulation of Gastrointestinal Processes, Pathophysiology of the Gastrointestinal Tract.
- e. Regulation of Organic Metabolism, Growth, and Energy Balance: Events of the Absorptive and Postabsorptive States, Endocrine and Neural Control of the Absorptive and Postabsorptive States, Fuel Homeostasis in Exercise and Stress Diabetes Mellitus, Hypoglycemia as a Cause of Symptoms, Regulation of Plasma Cholesterol, Bone Growth, Environmental Factors, Influencing Growth, Hormonal Influences on Growth, compensatory Growth, Basic Concepts of Energy Expenditure, Regulation of Total Body Energy Stores, Regulation of Body Temperature.
- f. Reproduction: General Principles of Gametogenesis, Anatomy, Spermatogenesis, Transport of Sperm, Hormonal control of Male Reproductive Functions, Anatomy, Ovarian Function, Control of Ovarian Function, Uterine Changes in the Menstrual Cycle, Other Effects of Estrogen and Progesterone, Androgens in Women, Female Sexual Response, Pregnancy, Sex Determination, Sex Differentiation, Puberty, Menopause.
- g. Defense Mechanisms of the Body: Cells Mediating Immune Defenses, Nonspecific Immune Defenses, Specific Immune Defenses, Systemic Manifestations of Infection Factors that Alter the Body's Resistance to Infection, Harmful Immune Responses, Absorption, Storage Sites, Excretion, Biotransformation, Functions of Cortisol in Stress, Functions of the Sympathetic Nervous System in Stress, Other Hormones Released During Stress Psychological Stress and Disease.

NOTE: Special emphases should be given on the normal physiological values and their changes during respective pathological conditions. Furthermore, the physiological link will be developed with pathology as well as pharmacology.

PHYSIOLOGY (Practical)

Paper 10

Marks 100

NOTE: Practicals of the subject shall be designed from time to time on the basis of the above mentioned theoretical topics and availability of the facilities, e.g. Experimental Physiology includes:

1. **BLOOD:** Determination of Haemoglobin (Hb), Determination of ESR, RBC Count, WBC Count, DLC (Differential Leucocyte Count), Bleeding Time, Coagulation Time and Blood groups.
2. **RESPIRATION:** Estimation of vital capacity and its relation to posture and standard vital capacity, Determination of Tidal volume and Demonstration of Artificial Respiration.
3. **CARDIOVASCULAR SYSTEM:** Recording of Arterial Pulse, Recording of Arterial Blood Pressure and Electro-cardiogram.
4. **SENSORY SYTEM:** Visual activity, far vision, near vision and Field of vision (Perimetry).
5. **NEURAL CONTROL MECHANISM:** Nerve Muscle Preparation in frog, Effect of Temperature on muscle and Demonstration of spinal reflexes.

ANATOMY & HISTOLOGY (Theory)

Paper 5

Marks 50

Course Objectives: After the completion of this course the students should be able to understand the basic structure of various organs of our body not only at gross level but also at tissues or cell level

1. **INTRODUCTION: ANATOMICAL TERMINOLOGY:** Definition. Cell, tissue, organ system.
2. **STRUCTURE OF CELL:** Cell Membrane, Cytoplasm, Organelles, Nucleus, Cell cycle.
3. **TISSUES OF BODY:** Types of tissues with examples;
 - a. Epithelial Tissue: General characters, classification.
 - b. Connective Tissue: Structure and types of Connective tissue and Cartilage.
 - c. Bones: Structure and types of bones and joints.
 - d. Muscles: Structure of skeletal muscle, smooth muscle and cardiac muscle.
4. **INTEGUMENTARY SYSTEM:**
 - a. Skin Structure: (Epidermis, dermis).
 - b. Glands of Skin: (Sweat, Sebaceous).
 - c. Hair: Structure, function.
 - d. Nail: Structure, function.
5. **CARDIOVASCULAR SYSTEM:**
 - a. Heart: Structure of Heart, Location of Heart, Blood Supply to Heart.
 - b. Blood Vessels: Main blood vessels arising & entering the heart. Types of blood vessels