

Gousar

Appendix – III
FIRST BACHELOR IN PHYSIOTHERAPY
(1-YEAR DURATION)

ANATOMY
GENERAL ANATOMY-

Cell	(Part, Name of Cytoplasm organelles and inclusion with Functions)
Epithelium	Types with examples and light microscopic structure.
Connective Tissue	Classification with emphasis to tendon
Cartilage	Types with example
Bone	Types with example, types of Ossification (Stages of Ossification not required) Blood supply, Fracture repair.
Joints	Classification with example, emphasis to synovial joint.
Muscles	Types (details of EM picture not required)
Nervous tissue	Structure of a Neuron, synapse Reflex arc, Degeneration and Regeneration of the Nerve.
Embryology	a) Ovum, Spermatozoa, fertilization and formation of the germ layers and their derivations. b) Development of skin, fascia, blood vessels, lymphatic. c) Development of bones, axial and appendicular skeleton and muscles. d) Neural tube, train vessels spinal cord. e) Development of brain (brain stem) structures.

REGIONAL ANATOMY

SUPERIOR EXTREMITY

Theory

Axilla, Brachial plexus, shoulder joints, sterno-clavicular joints, Axillary lymph Nodes, Elbow joint, Superior Radio-ulnar joint, Nerves of arm and fore arm, Synovial Bursa of hand and palmar space, ulnar Nerve in hand, Cutaneous distribution according to dermatomes, clinical Anatomy, Surface Anatomy.
Practical/Demonstration

Pectoral Region, Axilla Scapula and Clavicle, Humerus, Muscles of arm (Front & Back), Radius, Front of forearm, Ulna, back of forearm, Muscles of Palm & arterial arches, Articulated hand (Carpals and Meta Carpals name and arrangements in order only).

INFERIOR EXTREMITY

Theory

Lumbar plexus, Inguinal group of Lymph Nodes, Hip joint, Femoral triangle and femoral sheath, Knee joint, venous drainage of Inferior Extremity, Sciatic Nerve and its distribution, obturator Nerve, Arches for foot, Mid tarsal and sub-talar joint, Cutaneous distribution according to myotome, Clinical anatomy, Surface Markings.

Practical/ Demonstration

Hip bone, Gluteal Muscles, Femur, front of thigh, Back of thigh, Medial side of thigh, Tibia, Anterior

Compartment of leg, Fibula, Lateral compartment of leg, Back of leg, Articulated foot (Identification of tarsal and Meta tarsal only).

Abdomen and pelvis

Theory

Abdominal wall, Inguinal canal, Stomach, Liver, pancreas, Kidney with ureter and spleen, small Intestine, Large Intestine, Abdominal Aorta, Portal vein, Diaphragm. Sacral plexus, Sacro-iliac joint, Intervertebral disc.

Practical / Demonstration

Abdominal viscera, Sacrum, Bony pelvis, Viscera of Pelvis and Blood vessels.

THORAX

Theory

Thoracic cage and Mediastinum, Heart with its internal and external features, Blood vessels, Typical spinal Nerve, Typical Intercostals space, Mechanism of Respiration, Surface markings of Heart and Lungs.

Practical / Demonstration

Superior Mediastinal structures, Sternum, Ribs (only general features), Vertebrae (Identification, general features, Functional Components, Development, Vertebral Column with weight transmission), Heart, pleura & Lungs.

HEAD & NACK

Theory

Temporo-mandibular Joint, Atlanto-occipital and Atlanto-Axial joint, Cutaneous ditribution of trigeminal Nerve.

Practical / Demonstration

Mouth cavity, Nasal cavity, Pharynx and Larynx (Parts, sensory distribution), Cranial bones (Identification of Individual bone general features, different formina in relation to cranial Nerve, Cranial fossae and their relations to brain and Hypophysis).

Identification of Anterior and Posterior triangles of Neck with their contents.

Radiological Anatomy of Musculo Skeletal system.

NERVOUS SYSTEM

Theory

General Introduction and classification, Autonomic Nervous system (Idea about Sympathetic and Parasympathetic with their difference in distribution and function).

Spinal cord with its Meaning, Spinal Reflex, Pyramidal and Extra-Pyramidal tracts (Detail Nucleus not required) Blood supply.

Fore brain- Cerebral hemisphere, functional areas and blood supply.

Practical/Demonstration

Spinal cord and parts of brain.

CRANIAL NERVES

Names in order, Individual cranial nerve, distribution, Idea about upper Motor Neuron and Lower Motor Neuron, applied Anatomy.

HISTOLOGY PRACTICAL

Epithelium (Simple, Compound)
Connectivity tissue (Cartilage & Bone)
Muscle (Smooth & skeletal)
Nervous tissue (Neuron)
Blood vessels (Large artery and vein)

PHYSIOLOGY

GENERAL PHYSIOLOGY

1. Introduction and scope of Physiology.
2. cell and tissue-Its structure, principal constituents, properties and functions including cell division.
3. Body Fluid.

Blood: Composition and general functions of plasma. Blood cells-structure and function- Red Blood cells, white Blood Cells-including numbers and approximate length of life – position, structure and function of cells of Reticulo endothelial system.

Blood clotting including bleeding time and clotting time, factors accelerating or slowing the process. Blood groups and their significance, Rh- factor, Hemoglobin and E.S.R
Formation of Blood, tissue fluid and lymph.

4. Cardio-Vascular System.

Structure and properties of Heart Muscles and nerve supply of Heart.

Structure and functions of arteries, capillaries and veins.

Cardiac cycle and Heart sound.

Cardiac output measurements, factors affecting Heart Rate and its regulation,

Cardio-vascular reflexes.

Blood pressure, its regulation, physiological variation, peripheral resistance, factors Controlling Blood Pressure, Hemorrhage.

ECG study and stress test.

5. Respiratory System.

Mechanism of Respiration, changes in diameters of thorax-Intra-pleural and intra-pulmonary pressure. Quantities of lung volume, tidal and residual volume, vital capacity.

Gaseous inter-changes in lung and tissues.

Control of respiration- Nervous and chemical significance of changes in rate and depth, transportation of oxygen and carbon-dioxide.

Respiratory states-anoxia, Cyanosis Acclimatization.

6. Digestive System

General arrangement of alimentary canal, liver pancreas-position, structure and functions.

Nutrition and Diet-carbohydrates; protein, fat, salts, water, vitamins and minerals digestion, absorption and Metabolism.

7. Reproductive System.

Sex determination and development of puberty, male sex hormones, spermatogenesis, Female sex hormones, menstrual cycle. Ovulation, pregnancy, Function of placenta, lactation.

8. Excretory System.

Gross and minute structures of kidney, renal circulation, Mechanism of formation of urine, Glomerular filtration rate and tubular function, renal function and renal tests. Physiology of micturition.

9. Endocrine System.

Structure and functions of pituitary (anterior & posterior). Thyroid, Para-thyroid, adrenal cortex, adrenal medulla, Thymus and pancreas.

Blood sugar regulation.

10. Skin-Structure and functions.

PHYSIOLOGY

cell membrane-Ionic and Potential gradient and transport.
 Muscle- Types of muscular tissue – Gross and Microscopic structure – function. Basis of muscle contraction – changes in muscle contraction, Electrical – Biphasic and mono-phasic action potentials, chemical, Thermal and physical changes, Isometric and Isotonic contraction.
 Motor units and its properties – clonus, tetanus, all or none law Fatigue.
 Nerve- Gross and microscopic structure of nervous tissue, one neuron- Generation of action potential – Nerve impulse condition.
 Neuromuscular Junction
 Degeneration, Regeneration of peripheral nerves Wallerian degeneration, electro tonus and Pflüger's law.
 Types and properties, of receptors, types of sensations, synapse, reflex, are its properties occlusion, summation, sub minimal fatigue etc.
 Tracts – Ascending and descending and extra – pyramidal tracts Functions of E.E.G.
 Function
 Reticular formation – tone, posture & equilibrium, autonomic nervous system.
 Special Senses Eye-Errors of refraction, lesions of visual pathways.
 Speech and its disorders.
 Ear and Vestibular apparatus, taste, olfactory, somatic sensations

PRACTICAL PHYSIOLOGY/ DEMONSTRATION

Hematology:- RBC count, WBC count, differential count. ESR Bleeding & Clotting time, Estimation of hemoglobin, Blood group.
 Human Physiology:- Examination of (a) Respiratory system (b) heart and arterial pulse (c) Deep and superficial reflexes (d) Cranial nerves (e) motor system. (f) sensory system including higher function (g) measurement of blood pressure.
 Effect of Exercises on body physiology

BIO- CHEMISTRY

1. **BIO-PHYSICS:**
Concepts of PH and buffers, Acid-base equilibrium, osmotic pressure and its physiological applications.
2. **CELL:**
Morphology, Structure and functions of cell, cell membrane, Nucleus, Chromatin, Mitochondria, endoplasmic reticulum, Ribosome.
3. **CARBOHYDRATES, LIPIDS & PROTEINS & METABOLISM:**
Definition, functions, sources, classification & metabolism
4. **VITAMINS:**
Classification, Fat soluble vitamins A,D,E,K, Water soluble vitamins –B Complex and Vitamin 'C', Daily requirement physiological functions and disease of vitamin deficiency.
5. **BIO-ENERGETICS:**
Concept of free energy change, Energetic reaction and endergenic reactions, Concepts regarding energy rich compounds. Respiratory chain and Biological oxidation.
6. **WATER AND ELECTROLYTES:**
Fluid compartments, Daily intake and output, Dehydration, Sodium and potassium Metabolism.
7. **MINERAL METABOLISM:**
Iron, Calcium, phosphorous, Trace elements
8. **NUTRITION:**
Nutritional aspects of carbohydrate, fat and proteins, Balanced diet, Metabolism in exercise and injury, Diet for chronically ill and terminally ill patients
9. **CONNECTIVE TISSUE.**
Mucopolysaccharides, Connective tissue proteins, Glyco-proteins, Chemistry and Metabolism of bone and teeth.
10. **NERVE TISSUE :**
Composition, metabolism, Chemical mediators of nerve activities.
11. **MUSCLE TISSUE:**
Structure, Metabolism of muscles, Muscle contraction.
12. **General Characteristic and Mechanism of Hormone actions.**

EXERCISE THERAPY –1

1. basic physics in exercise therapy. Mechanics: Force, Gravity line of gravity, center of gravity in human body, Base equilibrium, Axes and Planes, mechanical principles of lever order of lever, examples in human body, pendulum, spring.
2. Massage: Definition of massage, type of massage, genera effects and uses of massage, type of massage, general effects and uses of massage, local effects of individual manipulation (physiological effects), contra-indications techniques of application of all manipulations-stroking Effleurage, kneading and picking up, skin rolling (back) clapping, tapping, friction etc.
3. Suspension Therapy: Principles of suspension, types of suspension therapy, effects and suspension therapy-their application either to mobilize a joint to increase joint range of motion or to increase muscle power-explaining the full details of components used for suspension therapy.
4. Introduction to exercise therapy.
5. Starting positions- Fundamental starting positions- standing, sitting kneeling, lying and-hanging. All the derived positions of the above five fundamental starting positions.

6. Classification of movements in details:
Active- Voluntary in definition involuntary movements, resisted exercise, Active- Assisted and Resisted exercise.
7. Voluntary movements: Free exercise, assisted exercises, resisted exercise, Active-Assisted and Resisted exercise.
8. Assisted Exercises: Technique and uses.
9. Free exercises -Classification, technique, effects of frequent exercise on various systems etc.
10. Resisted Techniques and types of resistance, SET system (Heavy resisted exercises, Oxford method, De Lorme method, Mc queen method.
11. Relaxed passive movements, basic knowledge of classification of relaxed passive movements, definition, technique, effects and uses of relaxed passive movement.
12. Muscles strength: Anatomy and physiology of muscle tissue causes of muscle weakness paralysis, prevention of muscle weakness/paralysis Types of muscle work and contraction ranges of muscle work, prevention of muscle atrophy
13. Joint Movement: Classification of joint movements causes of restriction of joint movement, prevention of restriction of joint range of motion, etc. Principles of mobilization of a point in increasing its range of motion Technique of mobilization of a stiff joint, Goniometry.
14. Bed Rest-Its necessity & Complications.
15. Posture: Types, factors responsible for posture, factors for poor posture, principles of development of good posture.
16. Breathing exercises: Physiology of respiration, types of breathing exercises, techniques of various types of breathing exercises, its effects and uses.
17. Hydrotherapy: Introduction, various types of hydrotherapy units, construction and equipments used in hydrotherapy Principles, indications, contraindication, effects and uses of hydrotherapy. Precautions towards patient, towards therapist, equipment unit etc.

Practical

1. Massage Therapy
2. Suspension Therapy
3. Relax passive movement / types of exercise.
4. MMT
5. Goniometry
6. Breathing exercise
7. Practical record

ELECTROTHERAPY - 1

Electrical fundamentals- Physical Principles- Structure and properties of matter" molecular atom, proton, neutron, electron, ion, etc. Electrical Energy: Nature of electricity- Current Static Electricity, Current Electric potentials generated by cell-Ohm's Law, Joule's Law.

Magnetic Energy: Nature and property of magnet, electromagnetic induction, principle of working of choke coil-transformer-rectification of A,C to D.C. Metal Oxide Rectifier, Semi-conductor -Diode and Triode.

Valves-Principle working-condenser-principle-Details of charging and discharging, etc. Transistors, measurement of current intensity, EMS and power-moving coil millimeter and voltmeter.

Wiring of components in series and parallel Distribution of Electrical energy-Earth Shock and electrical shock Safety Devices.

Principles of LOW FREQUENCY CURRENTS: Nature and principles of production of muscle

$$Q = I^2 R T.$$

(17)

stimulating current-Types of Low frequency currents used for treatment. High Voltage Galvanic current rectifying currents.

6. Principles of electro-diagnosis-strength duration curve-Chronaxie and Rheobase-Their relationship, etc.
7. Medium Frequency Current: Definition, Production (Brief), Physiological effects and therapeutic effects of Interferential Current, Russian current.
8. Actino Therapy: Definition, Production (Brief), Physiologiocal & Therapeutic effect of the following – Infrared radiation. Laser, Ultraviolet Radiation.
9. Therapeutic Heat: Definition, Principles, Physiological & therapeutic effects of moist heat, Paraffin wax bath, Contrast Whirl pool bath, Fluido therapy. Electric heating pads.
10. Cry therapy: Principlea, Physiological effects, uses of Cold packs, Ice massage, Commercial Cold Packs, Ice Towels, Cold compression Units, Evaporating Sprays.
11. Traction

PRACTICALS :

1. Galvanicz FARADIC CURRENT
2. Cold pack
3. Paraffin wax bath
4. Hot pack
5. Motor point stimulation
6. Practical record
7. Traction

Technique of application of various conditions and to various parts of the body.