

**DEPT OF PHYSIOLOGY IST MBBS (I TERM-AUG TO DEC)**

S. No	Name of practical
<b>HAEMATOTOLOGY EXPERIMENTS</b>	
1	Study of compound microscope: Parts of a microscope, Formation of an image, focussing of an object; Precautions
2	An introduction to experiments on blood: Collection of blood sample; commonly used anti coagulants; instruments used in the haematology lab
3	Estimation of haemoglobin by the Sahli's method
4	Study of the Hamocytometer
5	Determination of the total leucocyte (WBC) count:TLC
6	Determination of the total erythrocyte (RBC) Count
7	Preparation of a peripheral blood smear; Staining with Leishmann's stain; Identification of blood cells
8	Determination of differential leucocyte count
9	Determination of bleeding time (BT) and clotting time (CT)
10	Determination of blood groups
11	Determination of erythrocyte sedimentation rate (ESR) by Westergren method (Demonstration)
12	Determination of packed cell volume (PCV) and calculation of blood indices
13	Determination of osmotic fragility of red blood cells ( Demonstration )
14	Determination of platelet count
15	Determination of reticulocyte count (Demonstration)
16	Determination of absolute eosinophil count (Demonstration)
<b>AMPHIBIAN EXPERIMENTS</b>	
1	An introduction to amphibian experiments; Study of the apparatus used in the amphibian laboratory
2	Gastrocnemius muscle and sciatic nerve preparation of frog
3	Study of the excitable and contractile properties in an amphibian nerve muscle preparation a) effect of sub-threshold, threshold and suprathreshold stimuli b) demonstration of isotonic contraction
4	Effect of two successive stimuli (of same strength) on skeletal muscle contraction
5	Effect of increasing strength of stimulus on skeletal muscle contraction
6	Effect of increasing frequency of stimuli on skeletal muscle contraction (Genesis of tetanus)
7	Demonstration of work performed by skeletal muscle using Polyrite a) free loading and b) after loading conditions
8	Genesis of fatigue in skeletal muscle Demonstration of neuro muscular transmission in an amphibian nerve muscle preparation a) phenomenon of fatigue b) site of fatigue c) neuromuscular blocking
9	Determination of conduction velocity of the sciatic nerve
10	Recording of a normal cardiogram of frog
11	Effect of temperature on cardiogram
12	Effect of stimulation of vagosympathetic trunk and white crescentic line on frog's heart
13	Study of properties of cardiac muscle
14	Effect of variables (drugs) on intact frog's heart
15	Effect of variables (drugs and ions) on isolated frog's heart
16	Revision
<b>HUMAN EXPERIMENTS</b>	
<b>NERVE AND MUSCLE</b>	
1	Phenomenon of human fatigue by a) Mosso's ergograph b) Hand grip dynamometer for isometric exercise
2	Electromyography (demonstration)
<b>DIGESTIVE SYSTEM</b>	
1	Clinical examination of abdomen

**DEPT OF PHYSIOLOGY IST MBBS (II TERM- JAN TO JUN)**

<b>S. No</b>	<b>Name of practical</b>
<b>CARDIOVASCULAR SYSTEM</b>	
1.	Introduction to clinical examination and general physical examination; recording of body temperature
2.	Clinical examination of the cardiovascular system
3.	To study the cardio- respiratory response to exercise
4.	To study the response of skin to blunt injury (triple response)
5.	To study the cardio vascular response to exposure of hand to cold
6.	Determination of physical fitness of a subject using screening tests
7.	Determination of non invasive assessment of autonomic nervous functions
8.	Recording of systemic arterial pressure (Sphygmomanometry)
9.	Effect of posture on blood pressure
10.	Effect of exercise on blood pressure
11.	Recording of a 12 lead electrocardiogram (Demonstration)
<b>RESPIRATORY SYSTEM</b>	
1.	Recording of chest movements by stethography and to study the effects of speech, swallowing, coughing, breath holding and hyperventilation
2.	Vitalography: effect of posture on vital capacity
3.	Lung function tests Spirometry: determination of lung volume and capacities Peak flow rate by peak flow meter
4.	Clinical examination of the respiratory system
5.	Cardio pulmonary resuscitation to demonstrate the technique of artificial respiration and cardiac resuscitation
6.	Measurement of basal metabolic rate (BMR)
7.	To determine energy cost of work and mechanical efficiency using a bicycle ergometer (demonstration)
<b>CENTRAL NERVOUS SYSTEM</b>	
1.	Examination of higher functions
2.	Examination of cranial nerves I-VI
3.	Examination of cranial nerves VII-XII
4.	Examination of motor system
5.	Study of superficial and deep reflexes
6.	Examination of sensory system
7.	Revision
8.	Perimetry: mapping of the visual field Mapping of the blind spot
9.	Recording of EEG (demonstration)
10.	Examination of ocular fundus
11.	Calculation of conduction velocity in human ulnar nerve
<b>OTHERS</b>	
1	Visit to the hospital to demonstrate some typical cases-
2	Anemia, polycythemia, purpura, haemophilia, jaundice
3	Nerve injuries
4	Respiratory and cardiac cases to show dyspnoea, orthpnoea, cyanosis, oedema, clubbing, bronchial asthma
5	Hemiplegia, Paraplegia, facial nerve palsy, Parkinsonism, cerebellar lesions
6	Hyper and hypothyroidism, Cushing's syndrome
7	Recording of body temperature and effect of exposure to cold and hot environment
8	To study human diuresis
9	Diabetes, other endocrine cases when available

## DEPT OF PHYSIOLOGY 1ST MBBS (I TERM-AUG TO DEC)

S. No	Topic
<b>1</b>	<b>General Physiology---</b>
	Introduction to Physiology: functional organization of human body and composition
	Homeostasis and control mechanism
	Cell membrane
	Cell organelle
	Inter cellular connection
	Genetic control of protein synthesis, apoptosis
	Transport across the cell membrane
	Resting membrane and action potential
<b>2</b>	<b>Nerve and muscle Physiology</b>
	Introduction-structure and function of neuron
	Classification and properties of nerve fibres
	Conduction of action potential in nerve fibres and factors affecting nerve conduction;
	Monophasic and biphasic action potentials
	Strength duration curve, nerve degeneration and regeneration
	Structure of skeletal muscle including sarcomere system; types of muscle fibres and Motor unit
	Neuromuscular junction; structure, transmission and applied aspects
	Excitation-contraction coupling
	Molecular Basis of muscle contraction
	Properties Of skeletal muscle
	Muscle Energetic and metabolism, fibrillation, fasciculation and EMG
	Smooth muscle; structure, types , Mechanism of contraction; properties and regulation of contraction
<b>3</b>	<b>Blood</b>
	Introduction: Composition and functions of blood, plasma proteins
	Principles Of hemopoiesis, RBC morphology; stages of erythropoiesis
	Regulation of erythropoiesis; stem cells and their clinical applications
	Haemoglobin: structure, function, types and abnormalities
	Iron Metabolism and RBC breakdown
	Haemoglobin Breakdown and physiological basis of jaundice
	ESR, PCV and blood indices
	Classification and physiological basis of anemia
	Types of WBC : leucopoiesis and its regulation
	Function of WBCs and phagocytosis
	Immunity : introduction, classification, monocyte-macrophage System
	Innate and acquire immunity
	Hypersensitivity; immunological basis of graftrejection
	Blood groups : types and clinical importance
	Physiological basis of transfusion reaction
	Platelets : thrombopoiesis and its regulation,, structure and functions
	Hemostasis and blood coagulation tests
	Anticoagulants ; fibrinolytic system ; abnormalities of hemostasis
<b>4</b>	<b>Autonomic Nervous System</b>
	Organisation & functions

S. No	Topic
<b>5</b>	<b>Cardiovascular System</b>
	Introduction, general organization of CVS, functional anatomy of heart
	Properties of cardiac muscle
	Cardiac action potentials
	Origin & conduction of cardiac impulse
	ECG – basis of ECG, Normal ECG, method of recording, vector analysis, electrical axis of Heart & abnormalities of ECG
	Cardiac cycle
	Heart sounds, murmurs & their clinical significance
	Regulation of cardiac contractility & heart rate
	Vascular system – anatomical consideration & their functional interrelationship
	Hemodynamics – pressure flow & resistance, functions of arterial & venous system
	Microcirculation & capillary fluid exchange
	Lymphatics & physiology of oedema
	Regulation of local blood flow
	Cardiac output – introduction, measurement, factors affecting & regulation
	Arterial pressure – introduction, short term regulation, long term regulation, hypertension.
	Shock – physiological basis, stages & management
	Physiological basis of cardiac failure
	Regional circulation – coronary, cerebral, cutaneous, splanchnic circulation
<b>6</b>	<b>Exercise physiology</b>
	Energetics, types of skeletal muscles, muscles in exercise, cardiorespiratory responses during exercise
<b>7</b>	<b>Respiratory system</b>
	Introduction –lungs, airways, alveoli, blood flow, ciliary function, functions of nose
	Mechanism of ventilation- inspiration, expiration, intrapleural pressure, alveolar and Expired air composition, surfactant, airway resistance, factors affecting tissue resistance, compliance, work of breathing, pulmonary ventilation and alveolar ventilation
	Lung volumes and capacities
	Diffusion of gases across alveolar membrane
	Pulmonary circulation, ventilation perfusion ratio
	Transport of O <sub>2</sub> , oxygen haemoglobin dissociation curve
	Transport of CO <sub>2</sub>
	Neural control of respiration, chemical control of respiration
	Hypoxia , cyanosis, asphyxia, dyspnoea
	Physiological peculiarities of pulmonary abnormalities(COPD, pneumonia, asthma)
	Pulmonary function tests, oxygen therapy& artificial respiration
<b>8</b>	<b>GIT</b>
	Introduction, organizational plan
	GI smooth muscle-structure, innervation, concept of BER
	Hormonal control of GIT
	Salivary secretion- composition, mechanism, phases, regulation
	Mastication, deglutition, oesophageal motility and its disorders
	Gastric secretion-composition, mechanism, phases, regulation and applied physiology
	Pancreatic secretion- composition, phases, regulation
	Liver- functions, liver function tests
	Biliary secretion- composition and regulation of biliary secretion
	Small and large intestine- functional anatomy and secretions
	Digestion and absorption of ats, carbohydrates and proteins
	Gastric and intestinal motility and applied physiology
	GI reflexes and related disorders

## DEPT OF PHYSIOLOGY 1ST MBBS (II TERM-JAN TO JUN)

S. No	Topic
<b>1</b>	<b>Sensory system</b>
	Functional organization of central & peripheral nerves system
	Synapse – definition, types, properties, transmission, post synaptic potentials
	Neurotransmitters – classification & functions
	Receptors – definition, classification, properties & significance
	Somatic sensory modalities & related neurophysiology
	Sensory pathway – anterolateral system, dorsal column medial lemniscal system
	Physiology of pain – pain modulation., applied physiology
	Thalamus – functional anatomy, connections, functions & applied physiology
	Sensory cortex
<b>2</b>	<b>Motor system</b>
	Functional organization of motor system
	Reflexes – introduction & stretch , inverse stretch reflex, other spinal cord reflexes
	Cortical control of function – overview , corticospinal system, brainstem control of motor
	Function & other motor pathways
	Physiological bases of upper & motor neuron lesions & hemiplegia
	Vestibular apparatus – vestibular neck & equilibrium
	Cerebellum – functional anatomy, circuitry functions, disorders & their physiological bases
	Basal ganglia – functional anatomy, functions, neurotransmitters & disorders
	Control of tone & posture – introduction, animal preparations, postural reflexes
	Spinal cord lesions & spinal shock
	Integrated control of motor functions
<b>3</b>	<b>Higher mental functions</b>
	Functional organization of cortical areas & their functions
	Experimental methods to study cerebral functions
	Role of brain in language & speech
	Limbic system – physiology of emotions, motivation & behaviour
	Hypothalamus – organization & functions
	Learning & memory – types, physiological bases, applied aspects
	Reticular formation – organization & functions
	Electrical activity of brain & EEG
	Physiology of sleep
	CSF & blood brain barrier
<b>4</b>	<b>Special senses</b>
	Vision – structure, fluid system of eye, physical principles of optics, optics of eye, Photochemistry of vision, visual pathway, color vision, visual cortex, visual reflexes, movements of eye & field of vision
	Physiology of smell
	Physiology of taste
<b>5</b>	<b>Endocrinology</b>
	Introduction & mechanism of hormone action
	Methods of hormone assay, hypothalamopituitary axis, overview of pituitary hormones
	Growth hormone – actions , regulation & applied physiology
	Thyroid hormones – synthesis , regulation, actions & applied physiology
	Adrenal cortex – synthesis & functions of glucocorticoids, mineralocorticoids & adrenal sex steroids, regulation of adrenal cortical hormones & related disorders

S. No	Topic
	Adrenal medullary hormones – synthesis, action & applied physiology
	Calcium homeostasis – synthesis & actions, overview, actions & role of calcitonin & Vit –D, disorders
	Functional anatomy of endocrine pancreas, mechanism of action & secretion of glucagon, Regulation of blood glucose level, physiological basis of diabetes mellitus
<b>6</b>	<b>Reproductive system</b>
	Sex differentiation and development, hypothalamo pituitary gonadal axis in males and females, puberty
	Male reproductive system--- introduction spermatogenesis & its regulation, testosterone actions & its regulation of secretion
	Female reproductive system--- introduction, oogenesis, actions & regulation of ovarian hormones, phases of menstrual & ovarian cycles & their regulation, tests of ovulation, fertilization & implantation
	Physiology of pregnancy & lactation
	Contraception
	Fetal & neonatal physiology
<b>7</b>	<b>Renal system</b>
	Introduction and functional anatomy of kidney and renal function tests, renal blood flow
	Glomerular filtration and its regulation
	Tubular functions
	Concentration and dilution of urine
	Acid base balance- introduction, buffer systems, respiratory regulation, renal regulation, disorders
	Micturition and related disorders
	Body fluid compartments- introduction, measurement, renal regulation of ECF volume, regulation of ECF osmolality and its disorders
	Pathophysiology of renal failure and principles of dialysis, puberty
<b>8</b>	<b>Miscellaneous</b>
	Physiology of growth & ageing
	Nutrition – concept of balanced diet, BMR, physiological basis of obesity & starvation
	Body temperature regulation – hypothermia, balance between heat gain & heat loss, regulation of body temperature, applied physiology
	Environmental physiology – high altitude physiology, acclimatization & disorders, aviation & space physiology, deep sea physiology