

PHYSIOLOGY – single paper

DEGREE STANDARD

In teaching Human Physiology stress will be laid more on human aspects with the fundamental principles of the subjects having an emphasis on Physiological basis of Medical Practice. The course will also cover applied Physiology and Clinical Human Physiology as well as Environmental Physiology, Electric Physiology.

GENERAL PHYSIOLOGY:

General Principles in the study of Physiology, Cell-Physiology with membrane transport Biophysical consideration - Diffusion, Osmosis, etc. and Bioelectric Potentials. Growth, senescence and death, Instrumentation Methods, Biological Rhythms.

BLOOD AND BODY FLUID:

ECF, Homeostasis, Composition of blood and general functions. Plasma proteins, their functions, ESR, Erythrocytes. Erythropoiesis, Regulation of Erythropoiesis. Bone marrow. Hemoglobin RBC life span and - Jaundice. Anemia - types, absolute values in Hematology. Leukocytes - different types. Platelets, Coagulation, Coagulation disorders. Functions of Lymphocytes - Basic immunological mechanisms, Blood groups, transfusion of blood, blood volume and fluid compartments. Lymph and tissue fluids.

NERVE MUSCLE PHYSIOLOGY:

Neuron structure and functions, Biophysical consideration of RMP, Action potential, Oscilloscope and record of electrophysiological changes in muscles and nerves - eg, RMP, Action Pot., ECG, EEG, EMG etc. Generation and conduction of nerve impulse. Neuro Muscular Junction and Excitation contraction coupling.

Structure and Composition of muscles Mechanics of muscular contraction, energy metabolism of muscular contraction Trauma, degeneration and Regeneration, Electromyography Myopathies, smooth muscle and mechanism of locomotion. Neuro-muscular junction, transmission across NMJn. (Excitation - contraction coupling).

GASTROINTESTINAL SYSTEM:

Organisation plan Saliva - Composition function and regulation Stomach - Composition, function, mechanism of HCL Secretion and regulation, Gastric emptying. Pancreas and liver, secretion, composition and regulation small and large intestines. Movements and their control absorption from GIT, Functional Tests, Vomiting, assessment of functions, defaecation.

EXCRETORY SYSTEM:

General Introduction, Human Kidney, Nephron, Urine formation, Composition of urine and abnormal constituents Functional efficiency of renal secretory system. Homeostasis by Kidney Water and electrolyte balance of ECF, Acid-Base balance, Non excretory function of Kidney. Urinary bladder and micturition. Pyelography, Renal failure, Peritoneal dialysis and artificial Kidney.

ENDOCRINOLOGY:

Functional Anatomy of the Endocrine glands. Hypothalamic-Hypophyseal portal system. Pituitary- Anterior and Posterior, Pars intermedia, Anterior pituitary hormones Mechanism of their secretion. Functions Hypo and Hyper secretion. Neuro-Hypophysis. ADH and Oxytocin, Pars Intermedia and MSH.

Adrenal gland - Cortex different hormones, functions, regulation of secretion. Hypo and Hyper activity states. Adrenal Medulla - Adrenaline and Noradrenaline. Functions Regulation of secretion, Hypo and Hyper active states.

Thyroid - Thyroid hormones. Functions, regulation of secretion, Hyper and Hypo active states. parathyroid - calcium and phosphate metabolism. Functions, regulation of secretion. HYPO and HYPER active states - pancreas - Hormones, functions, regulation of secretion - Diabetes, Hypo and Hyper active states, other hormones - Renin - Angiotensin mechanism, ANP, Endothelin, local hormones.

REPRODUCTION:

Physiology of reproduction. Adolescence puberty, menopause, cyclin activity in females and non cyclic activity in males. Gamete genesis, Fertilisation, pregnancy, fetal sex determination, differentiation, parturition, lactation, population trends in India. Testis, testicular hormones, function and regulation. Ovary, structural function, ovulation Hormones of Ovary functions and regulation of Ovary, menstrual cycle, Physiological basis of oral contraceptives.

RESPIRATORY SYSTEM:

Internal and external respiration different parts of respiratory system. Mechanics of respiration pulmonary ventilation, respiratory compliance. Surfactant, lung volumes and capacities. Alveolar ventilation composition of different gases, dead space, uniformity of alveolar ventilation, pulmonary circulation. Ventilation/perfusion ratio; O₂ and CO₂ transport. Control of respiration-Nervous and chemical.

Hypoxia classification, High altitude physiology acclimatization and dysbarism. Gynaecosis. Non-respiratory functions of lung. Hemo respiratory and cardio vascular co-ordination and homeostasis.

CARDIOVASCULAR SYSTEM:

Structure and properties of cardiac muscle, cardiac metabolism. Cardiac impulse-generation and conduction.

Electrocardiography - Normal ECG, abnormal rhythms, cardiac cycle-pressure and volume changes, pressure changes in the atria and ventricles. Heart Sounds, Murmurs, Coronary circulation angina pectoris and coronary thrombosis. Cardiac output, regulation of cardiac output.

Heart - lung preparation - heart rate and its control capacitance and resistance vessels -

Hemodynamics - Methods of Measuring blood flow - circulation time. Blood Pressure - Physiological Variation - Regulation of B.P Cardiovascular changes - changes during exercise, cerebral circulation - placental and fetal circulation. Venous circulation - cutaneous circulation - Hypertension and hypotension - Heart failure - hemo-dynamics in heart diseases.

ENVIRONMENTAL PHYSIOLOGY:

Environment, definition - skin, structure and function, temperature regulation - fever, response to cold environment hypothermia, altitude and space physiology - Hyperbaric environment, environmental pollution.

NERVOUS SYSTEM:

General features of the nervous system - structural and functional organisation - neurones, CSF Barrier mechanisms, synapse and synaptic transmission.

SENSORY MECHANISM:

Receptors, classification - Ascending pathways - Thalamus and its functions. Thalamus nuclei, thalamic syndrome cerebral cortex sensory, motor areas - investigative techniques pathophysiology of pain, visceral and referred pain - mechanism of head ache - lower motor neurone - reflexion - properties and significance - stretch reflex - spinal cord and brain stem reflexes - muscles spindle supporting reactions - reticular formation - organisation, connection and functions, Cerebellum projections - localisation and functions - cerebellar lesions - basal ganglia, functions - motor areas corticospinal tracts - regulation of tone, posture and equilibrium - locomotion and skilled movement - lesions of spinal cord, brain stem - lower motor neurones - autonomic nervous system - hypothalamus - connections and functions - limbic system - functions conditioning - learning and habit formation - speech and speech disorders - EEG-Sleep, dreams and disorders of sleep motivation, emotions and intellectual functions.

SPECIAL SENSES:

Eye-Introduction - anatomy of the eye-intraocular fluids and pressure - errors of refraction - Schematic eye-movements of eye ball-strabismus - photoreceptor mechanism - retina functions of retina - photo-chemistry - colour vision - electro retinogram-visual pathway visual reflexes - visual defects and their evaluation - lesions of the visual pathway.

EAR:

Anatomy of the ear-sound transmission through external ear-middle-ear-protective reflex - physiology of internal ear.

Transmission of sound ways in cochlea-auditory pathways, and central mechanism of hearing - deafness and test of hearing, audiometry-vestibular mechanism-functions sense of taste and flavours - mechanism of tests perception-sense of smell and appreciation dismen.