

Syllabus for PhD entrance Examination: Medical Physiology

Unit	System	Content
01	History of Physiology & General Physiology	History of Physiology Genetic control mechanism. Biophysics principles, Bioelectric potentials. Growth , Development and Ageing Regulations of Body fluids & electrolyte & applied aspects
02	Basic Biostatistics	Collection & Presentation of Data, Measurement of Central tendency, Normal distribution, T-Test
03	Environmental Physiology	Physiology at High attitude, Hyperbarism, Regulation of body temperature, Space Physiology; Environmental pollution- radiation, smoke, noise, industrial.
04	Yoga & Meditation	Yoga Asanas, Physiological Effects of Yoga, Physiological Effects of Meditation, Health Benefits of Yoga & Meditation.
05	Endocrine System	Introduction; Mechanism of hormone action; Endocrine functions of Hypothalamus; Anterior pituitary hormones: functions, regulation, disorders. Posterior pituitary hormones- ADH & Oxytocin functions, regulation, disorders; Thyroid hormones: synthesis, fate, functions, regulation, disorders; Parathyroid hormone: synthesis, functions, regulation, disorders. Adrenal cortex and Adrenal medulla Hormone: secretion, functions, regulation, disorders; Pancreatic hormones- Insulin & Glucagon secretion, functions, regulation, disorders.
06	Reproductive System	Sex Chromosomes, Determination, Differentiation; Functional Anatomy of Reproductive System; Puberty & Menopause ; Spermatogenesis & Testosterone ; Oogenesis; Menstrual cycle ; ovarian cycle & Ovulation; Estrogen & progesterone ; Placenta – Circulation, functions & Physiological basis of fertilization & implantation ; Pregnancy; parturition ; Lactation and contraception.
07	Cardiovascular System	General organization of CVS; Physiological anatomy of Heart; Cardiac muscle ; Excitatory and Conducting tissue; Electrocardiography: Normal ECG & abnormal ECG; Cardiac Cycle; Heart sounds; Heart rate and its regulation; Hemodynamics of blood flow; Arteries and Arterioles; Blood pressure, its regulation, applied; Microcirculation; Local Blood Flow Regulation, Lymphatic system; Oedema; Cardiac Output; Venous Return; Coronary Circulation; Ischemic heart disease; Cardiac failure; Circulatory Shock; Congenital heart

		Disease; Regional Circulations; Effect of exercise on CVS.
08	Respiratory System	Internal & External Respiration; Functional Anatomy of Respiratory Tract; Functions of respiratory system; Mechanics of respiration; Compliance; Surfactant; Lung volumes and capacities; Dead space; Diffusion of Gases; Respiratory membrane; Transport of O ₂ ; Oxygen-hemoglobin dissociation curve; Transport of CO ₂ ; Neural control of Respiration; Chemical control of Respiration; Pulmonary Circulation; Ventilation perfusion ratio; Hypoxia ; Respiratory adjustments in exercise; Artificial Respiration; Pulmonary function Test.
09	Kidney	Structure & Functions of kidney; Nephron- Functional unit; Juxtaglomerular Apparatus; Renal Circulation; Clearance ; Formation of urine: Glomerular Filtration, Tubular reabsorption & secretion; Concentration & Dilution of urine; Role of kidney in acid base balance; Physiology of micturition; Renal failure, dialysis; renal transplant; artificial kidney; diuretics; Composition of urine & abnormal constituents ; Renal Function Tests.
10	Special Senses	Vision: Functional anatomy of eye; Optics, Errors of refraction; Aqueous humor; Pupillary reflexes; Microscopic structure of retina, Rods & Cones, Photochemistry of vision ; dark & light adaptation; Colour vision ; Visual pathway; Visual cortex. Movements of eyeballs. Hearing: Physiological anatomy and Functions of external ear; middle ear and inner ear; Cochlea, Mechanism of hearing; Place principle, Auditory pathway & auditory cortex; Deafness, Audiometry. Taste: Functional anatomy of taste buds, different taste modalities, pathway, receptors of taste, pathways, applied. Smell: Functional anatomy of receptors, primary olfactory sensations, pathway, Applied.
11	Central Nervous System	General organization of Nervous System; Structural and Functional divisions and Levels; Synapse; Receptors; Ascending Tracts; Physiology of pain; Internal analgesia system; Sensory Cortex; Thalamus; Motor system – Organization and different motor components; Spinal cord – Organization for motor functions, Cord reflexes, Spinal shock; Reflexes; Muscle Spindle and Golgi tendon organs; Motor Cortex; Descending Tracts; Upper motor Neuron Lesion , Lower Motor Neuron Lesion; Brain stem – Role in control of Motor functions, Vestibular apparatus and brainstem nuclei, Maintenance and regulation of tone, posture and equilibrium; Cerebellum and its motor function; Basal Ganglia and its motor functions; Parkinson's disease; Higher function of the brain-learning, Memory, Language; Limbic system; Hypothalamus; Reticular activating system; Electroencephalogram; Sleep; Cerebral blood Flow and Cerebrospinal fluid.