Physiology

Marks distribution of Assessment of Physiology Total marks – 400 (Summative)

- Written= 200 (SAQ + SEQ) 140 + MCQ (SBA+MTF) 40+Formative 20)
- SOE =100
- Practical= 100 (OSPE40 + Traditional 50 +Note Book 10)

Cellular Physiology

Contents

Core:

- Physiology: Definition, goal & importance of physiology.
- Homeostasis: definition, major functional systems, control systems and regulation of the body function.
- The cell: functions of cell membrane and cell organelles.
- The cell membrane transport: active & passive transport, exocytosis & endocytosis, intercellular communication.
- Membrane potential: definition, basic physics of membrane potential, Resting membrane potential.
- Action potential: definition & propagation of action potential.
- Mechanism of skeletal muscle contraction & relaxation.
- Neuromuscular junction: transmission of impulse from nerve ending to muscle fiber.

Physiology of Blood

Contents

CORE:

- Blood: composition & functions.
- Plasma proteins: origin, normal values, properties, functions & effect of hypoproteinemia
- Development and normal values of formed elements.
- RBC: erythropoiesis.
- Hemoglobin: synthesis, types, functions & fate of hemoglobin.
- Red blood cell indices,
- Anemia, Polycythemia & Jaundice: definition & classification.
- WBC: Classification, morphology, properties & functions, leukocytosis, leucopenia.
- Platelet: morphology & functions.
- Hemostasis: definition & events.
- Coagulation: definition, mechanism,
- Clotting factors & fibrinolysis
- Blood grouping: ABO & Rh system
- Hazards of blood transfusion & Rh incompatibility.

Additional/Applied Physiology

- Bleeding disorder: thrombocytopenic purpura & hemophilia, tests for bleeding disorder

Cardiovascular Physiology

Contents

Core:

- Cardiac muscle: physiological anatomy, properties.
- Junctional tissues of the heart: generation of cardiac impulse & its conduction.
- Cardiac cycle: events, pressure & volume changes during different phases
- Heart sounds: types & characteristics
- ECG: principles, characteristics & interpretations
- Functional classification of blood vessels & microcirculation
- Interrelationship among pressure, flow and resistance.
- Local & humoral control of blood flow by the tissue.
- Exchange of fluid through the capillary membrane.
- SV, EDV, ESV, EF: definition & factors affecting them.
- Cardiac output: definition, measurement, regulation and factors affecting cardiac output.
- Venous return: definition and factors affecting.
- Peripheral resistance: definition & factors affecting.
- Heart rate: definition, normal values, factors affecting & regulation.
- Radial pulse: definition & characteristics.
- Blood pressure: definition, types, measurement & regulation of arterial blood pressure.

Additional/Applied Physiology

Circulatory adjustment during exercise, Coronary circulation
Cardiac arrhythmias: tachycardia, bradycardia, bradycardia & heart block
Shock: definition, classification. Physiological basis of compensatory mechanism of circulatory shock.

Respiratory Physiology

Contents

CORE:

- Physiological anatomy of respiratory system
- Respiration: definition, mechanism.
- Pulmonary & Alveolar ventilation.
- Pulmonary volumes and capacities (spirometry)
- Dead space: definition & types
- Pulmonary circulation- pressure in pulmonary system effect of hydrostatic pressure in lungs, pulmonary capillary dynamics.
- Composition of atmospheric, alveolar, inspired and expired air.
- Respiratory unit and respiratory membrane.
- Diffusion of Gases through the respiratory membrane.
- Transport of Oxygen & Carbon dioxide in blood & body fluid. Oxy-hemoglobin dissociation curve. Bohr effect, Haldane effect & chloride shift mechanism.
- Respiratory centers: name, location & functions.
- Nervous & chemical regulation of respiration.
- Lung function tests: name, significance
- Ventilation -perfusion ratio.
- Regulation of respiration during exercise.
- Hypoxia: definition, types

- Cyanosis: definition & types.

Additional/Applied Physiology
- Oxygen therapy in hypoxia
- Definition of dyspnea, hypercapnia & periodic breathing.

Renal Physiology
Contents

Core:
- Kidney: functions
- Nephron: types, parts, structure & functions
- Renal circulation: peculiarities & functional importance
- Urine formation: basic mechanism
- GFR: definition, determinants, measurement, control of GFR & regulation of renal blood flow
- Reabsorption and secretion by the renal tubules
- Definition of Tm, Renal threshold, tubular load & plasma load, plasma clearance and diuresis,
- Mechanism of formation of concentrated urine & diluted urine.\
- Micturition reflex

Additional/Applied Physiology
Abnormalities of micturition

Gastrointestinal Physiology
Contents

CORE:
- Physiological anatomy of gastrointestinal (GI) tract.
- Enteric nervous system.
- Local hormones of GIT: name, function & regulation of secretion
- Hormonal control of GI function.
- Movements of the GIT.
- GI reflexes.
- Functions of stomach, small intestine and large intestine

Additional / Applied Physiology
Pyloric pump

Endocrine Physiology and Physiology of Reproduction
Contents

Core:
- Endocrine glands: name & name of their hormones.
- Hormone: definition, classification, mechanism of action, assessment of hormone level.
- Hypothalamic hormones, releasing & inhibitory hormones: name and functions.
- Pituitary Gland: physiological anatomy.

- Pituitary hormones (anterior & posterior): name, functions, mechanism of actions and their control by the hypothalamus and disorders (dwarfism, gigantism, acromegaly & hypopituitarism and diabetes insipidus).
- Thyroid Gland: physiological anatomy.
- Parathyroid hormone: functions, mechanism of action & regulation of secretion.
- Adrenal Gland: physiological anatomy. Adrenocortical hormones: name, functions, mechanism of action, regulation of secretion & disorders (Addison's disease, Cushing's Syndrome, Conn's disease).
- Islets of Langerhan's of pancreas- hormones: functions, mechanism of action & regulation of secretion

Additional/Applied Physiology

Pathophysiology of insulin deficiency.

Contents

- Introduction to reproductive physiology, sex determination & sex differentiation. Puberty
- Functional anatomy of male reproductive system
- Secondary sex characteristics of male
- Testes: functional structure and functions
- Testosterone: function.
- Spermatogenesis: steps & hormonal control.
- Functional anatomy of female reproductive system
- Secondary sex characteristics of female
- Ovaries: functional structure and functions. Functional structure of uterus.
- Menstrual cycle: definition, phases and hormonal control.
- Ovarian cycle: phases and hormonal regulation.
- Ovulation: definition, mechanism & hormonal control.
- Definition of menstruation, menarche & menopause.
- Ovarian hormones
- Functions of estrogen and progesterone.
- Placental hormones: name & functions.
- Gamogenesis: development and lactation.

Additional/Applied Physiology

Indicators of ovulation. Anovulatory cycle.

Neurophysiology

Contents

Core:

- Functional organization of nervous system and functions of major levels of Central Nervous System (CNS).
- Neuron: definition, parts, types
- Nerve fiber: classification, properties, effects of injury/section to the nerve fiber
- Synapse: physiological anatomy, properties, types, synaptic transmission
- Neurotransmitters: definition, types, functions
- Sensory receptor: definition, classification, properties, receptor potential.
- General/somatic senses: definition, classification

- Ascending tracts/sensory pathways: name & function.
- Spinothalamic tract, tract of Gall, tract of Burdach, spinocerebellar tract: origin, course, termination & function.
- Cerebral cortex: name & functions of the Brodmann's areas
- Reflex: definition, classification, properties
- Reflex arc: definition, components
- Stretch reflex, withdrawal reflex, crossed extensor reflex, reciprocal innervation & planter response.
- Muscle spindle: definition, physiological anatomy, functions.
- Muscle tone: definition, function, maintenance
- Descending tracts/motor pathways: name & function.
- Pyramidal tract: origin, course, termination, function & effect of lesion.
- Extrapyramidal tract: name, functions.
- Upper motor neuron and Lower motor neuron: definition, example, effect of lesion.
- Spinal cord: hemi section.

Contents

- Cerebellum: functional division, functions, error control mechanism of motor activity & cerebellar disorder.
- Basal ganglia: functional components, functions & effects of lesion
- Thalamus, Reticular formation, limbic system: components & functions.
- Hypothalamus: name of the nucleus and functions
- Autonomic Nervous system: components and functions

Additional/Applied Physiology

Pain: types, dual pathway for transmission of pain, referred Pain. Thermostatic function of hypothalamus. Posture, equilibrium: definition, name of the areas controlling them. Sleep, memory: definition, name of the areas controlling them. Alarm or stress response.

Physiology of Body Temperature

Contents

Core:

- Normal body temperature, site of measurement, sources of heat gain, channels of heat loss, regulation of body temperature in hot and cold environment.

Additional/Applied Physiology

Heat stroke, hypothermia, frost bite, fever.

Physiology of Special Senses

Contents

Core:

- Vision: physiological anatomy of eye, image formation in the eyes, visual receptors, visual pathway, common refractive errors, photochemistry of vision, accommodation reaction, light reflex, dark & light adaptation, field of vision, color vision, color blindness, visual acuity.
- Hearing: auditory apparatus, receptor, mechanism of sound wave transmission, auditory pathway.
- Smell: smell receptors, olfactory pathway.
- Taste: taste receptors, modalities of taste sensation, taste pathway.

Additional/Applied Physiology
Effects of lesion in visual pathway.
Argyll Robertson pupil, Horner's syndrome.

Physiology Practical

Core:

- Developing skill in using of microscope & common laboratory equipment.
- Collection & preparation of blood sample.
- Observation of osmotic behavior of RBC
- Determination of total count of RBC,
- Determination of total count of WBC
- Determination of differential count of WBC.
- Estimation of hemoglobin.
- Observation of osmotic fragility of RBC.
- Determination of ESR
- Determination of PCV.
- Determination of Blood grouping (ABO & Rh system) & cross matching.
- Determination of bleeding time & clotting time.
- Interpretation of Red Cell Indices

Core:

- Measurement of Blood Pressure & effect of exercise on it.
- Auscultation of 1st & 2nd heart sounds.
- Examination of radial pulse.
- Recording & analysis of normal ECG (12 leads).**:**

Core:

- Examination of respiratory system (physiological aspect)
- Counting of respiratory rate.
- Auscultation of breath sounds.
- Determination of lung function tests including Spirometry.

Core:

- Examination of motor & sensory functions.
- Elicitation of the reflexes & interpretation of its clinical importance. (knee jerk, biceps jerk, triceps jerks & planter response).

Core:

- Auscultation of intestinal sound

Core:

- Determination of specific gravity of urine

Core:

- Examination of motor & sensory functions.

- Elicitation of the reflexes & interpretation of its clinical importance. (Knee jerk, biceps jerk, triceps jerks & planter response).

Core:

- Recording of the body temperature.
- Observation of the effect of exercise on body temperature.

Core:

- Observation of Light reflex,
- Interpretation of visual acuity and color vision.
- Conduction and interpretation of Rinne test & Weber test.