

## Syllabus for the post of

- (1) Professor, Physiology, Class-I (Advt. No. 42/2019-20)
- (2) Associate Professor, Physiology, Class-I (Advt. No. 70/2019-20)
- (3) Assistant Professor, Physiology, Class-I (Advt. No. 94/2019-20) (Special Recruitment)
- (4) Assistant Professor, Physiology, Class-I (Advt. No. 95/2019-20) (General Recruitment)

**Marks – 200**

**Questions – 200**

**Medium - English**

### **1. GENERAL & CELLULAR PHYSIOLOGY**

Cell as the living unit of the body, The internal environment, Homeostasis, Control systems, Organization of a cell, Physical structure of a cell, Transport across cell membranes, Functional systems in the cells, Genetic code, its expression, and regulation of gene expression, Cell cycle and its regulation.

### **2. HEMATOLOGY**

- **Erythrocytes:** erythropoiesis, structure & function of RBCs, formation of hemoglobin, destruction & fate of RBCs, anemias, polycythemias.
- **Leucocytes:** general characteristics, genesis & life span of WBCs, classification & functions of each type of WBC, leukopenia, leukemias.
- **Blood groups:**  
Classification, antigenicity, agglutination, blood typing, principles of transfusion medicine.
- **Hemostasis:**  
Components of hemostasis, mechanisms of coagulation, coagulation tests  
Anticoagulants.
- **Immunity:**  
Innate immunity, Acquired immunity, Allergy, hypersensitivity and immunodeficiency, Psychoneuroimmunology.

### **3. RENAL PHYSIOLOGY & FLUID BALANCE**

Body fluid compartments, Water balance; regulation of fluid balance, Urine formation, Regulation of extracellular sodium & osmolarity, Renal mechanisms

for the control of blood volume, blood pressure & ionic composition, Regulation of acid-base balance, Micturition, Diuretics, Renal failure.

#### **4. CARDIO-VASCULAR PHYSIOLOGY**

Properties of cardiac muscle, Cardiac cycle, Heart as a pump, Cardiac output, Nutrition & metabolism of heart, Specialized tissues of the heart, Generation & conduction of cardiac impulse, Control of excitation & conduction, Electrocardiogram, Arrhythmias, Principles of Hemodynamics, Neurohumoral regulation of cardiovascular function, Microcirculation & lymphatic system, Regional circulations, Cardiac failure, Circulatory shock.

#### **5. RESPIRATION**

Functional anatomy of respiratory system, Pulmonary ventilation, Alveolar ventilation, Mechanics of respiration, Pulmonary circulation, Pleural fluid, Lung edema, Principles of gas exchange, Oxygen & carbon-dioxide transport, Regulation of respiration, Hypoxia, Oxygen therapy & toxicity, Artificial respiration, Environmental Physiology.

#### **6. PHYSIOLOGY OF HOT ENVIRONMENT**

Physiology of cold environment, High altitude, Aviation physiology, Space physiology, Deep sea diving & hyperbaric conditions.

#### **7. NERVE & MUSCLE PHYSIOLOGY**

Resting membrane potential, Action potential, Classification of nerve fibres, Nerve conduction, Degeneration and regeneration in nerves, Functional anatomy of skeletal muscle, Neuro-muscular transmission and blockers, Excitation-contraction coupling, Mechanisms of muscle contraction, Smooth muscle.

#### **8. GENERAL, SENSORY & MOTOR PHYSIOLOGY**

General design of nervous system, Interneuronal communication, Classification of somatic senses, Sensory receptors, Sensory transduction, Information processing, Dorsal column & medial lemniscal system, Thalamus, Somatosensory cortex, Somatosensory association areas, Pain, Organization

of spinal cord for motor function, Reflexes & reflex arc, Brain stem & cortical control of motor function, Cerebellum, Basal ganglia, Maintenance of posture and equilibrium, Motor cortex.

## **9. SPECIAL SENSES**

Optics of vision, Receptors & neural functions of retina, Colour vision, Perimetry, Visual pathways, Cortical visual function, Functions of external and middle ear, Cochlea, Semicircular canals, Auditory pathways, Cortical auditory function, Deafness & hearing aids, Primary taste sensations, Taste buds, Transduction & transmission of taste signals, Perception of taste, Peripheral olfactory mechanisms, Olfactory pathways, Olfactory perception.

## **10. LIMBIC SYSTEM AND HIGHER NERVOUS SYSTEM**

Autonomic nervous system, Limbic system and hypothalamus, EEG, Sleep, Emotions & Behaviour, Learning & Memory, Yoga.

## **11. NUTRITION & METABOLISM**

Carbohydrates, Fats, Proteins, Minerals, Vitamins, Dietary fibre, Recommended Dietary Allowances, Balanced diet, Diet for infants, children, pregnant & lactating mothers, and the elderly, Energy metabolism, Obesity & Starvation.

## **12. GASTRO-INTESTINAL SYSTEM**

General principles of G-I function, Mastication & swallowing, Esophageal motility Salivary secretion, Gastric mucosal barrier, Pancreatic & biliary secretion, Gastrointestinal motility, Digestion & absorption, Functions of Colon, Pathophysiology of peptic ulcer and diarrheal disease, Liver functions.

## **13. ENDOCRINES & REPRODUCTION**

Classification of Hormones, Mechanism of Hormone action, Measurement of hormones in Blood, Endocrine functions of the hypothalamus, Pituitary, Thyroid, Adrenals, The endocrine pancreas, Pathophysiology of diabetes, Parathyroid, calcitonin, Vit D & calcium metabolism, Pineal gland, Testosterone & male sex hormones, Spermatogenesis, Hyper & hypogonadism, Menstrual

cycle, Female sex hormones, Pregnancy & Lactation, Functions of Placenta, Parturition, Lactation.

**14. RESEARCH METHODOLOGY.**

**15. MEDICO LEGAL ASPECTS RELEVANT TO THE DISCIPLINE.**

**16. INDIAN MEDICAL COUNCIL (PROFESSIONAL CONDUCT, ETIQUETTE AND ETHICS) REGULATIONS, 2002.**

**17. CURRENT TRENDS AND RECENT ADVANCEMENTS IN THE FIELD OF PHYSIOLOGY.**