

# RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER

## SYLLABUS OF SCREENING TEST FOR THE POST OF

### SENIOR DEMONSTRATOR – PHYSIOLOGY

#### MEDICAL & HEALTH DEPARTMENT

**Introduction – Physiological Principles** : Principles of homeostasis, Structure of cell membrane, Transport mechanisms, Intercellular communications, Fluid compartments of the body. Basic principles of Genetics.

**Blood** : Composition and functions of blood, types & functions of Plasma proteins.

– RBC- formation, function and anemia's

– WBC- formation, functions and Leukemia's

– Platelets – formation & function

– Hemoglobin- synthesis and functions, Blood groups- basis of blood grouping, clinical importance, blood banking and transfusion, Haemostasis & its applied, anticoagulants

**Muscle and nerve physiology** : Structure, functions and properties of a neuron and neuroglia, Molecular basis of resting membrane and action potential, Transmission of nerve impulse, Structure and transmission across neuro-muscular junction, Neuro-muscular blocking agents, Pathophysiology of Myasthenia gravis, Types and structure of muscle fiber, Action potential in different muscle types, Molecular basis of muscle contraction, Muscular changes during exercise, Properties of excitable tissue.

**Renal system** : Structure and function of nephron, GFR, Urine formation involving processes of filtration, tubular absorption & secretion. Mechanism of concentration of urine – counter current mechanism. Structure and function of a Juxta glomerular apparatus, Role of renin-angiotensin system, Fluid and electrolyte balance and its regulation, Innervations of bladder, micturition, abnormalities of micturition, Artificial kidney, dialysis and renal transplantation, Renal Function Test. Transport maximum and renal threshold. Acid base balance.

**Digestive system** : General organization of GIT muscles, innervation & nerve plexuses. Functions & composition of - Salivary secretion, Gastric secretion, Pancreatic secretion, Intestinal secretion. Bile, Gastro-intestinal hormones-source, regulation and functions, Gastro-intestinal movements, Pathophysiology of peptic ulcer, G.I.T. reflexes. Vomiting, diarrhoea, constipation. Dietary fibres. Liver – structure and functions, function tests. Jaundice – types & laboratory investigations. Digestion and absorption of carbohydrates, proteins and fats. Role of vitamins, minerals and trace elements.

**Endocrinology** : Types of hormones, mechanism of hormone action, Estimation and assessment of Hormones. Physiological actions and effect of altered secretion of Pituitary gland, Thyroid gland, Parathyroid gland, Adrenal gland, Pancreas, Pineal and hypothalamus.

**Reproductive system** : Functions of testis & ovary, Spermatogenesis & factors influencing it, Menstrual cycle-hormonal, uterine and ovarian changes, Physiological changes during pregnancy and lactation, Physiological basis for pubertal changes, Physiological effect of sex hormones, Contraceptive methods (male and female methods)

**Cardiovascular system**: Structure and properties of cardiac muscle, Conducting system of heart, Haemodynamics of circulatory system, Regulation of heart rate and blood pressure and cardiac output, Electrocardiogram-physiological basis and applications, Regional circulation-coronary, cerebral, capillary, foetal and pulmonary circulation. Physiology of shock, coronary artery disease, hypertension, Cardio-pulmonary resuscitation, Abnormal ECG.

**Respiratory system** : Functional anatomy, physical principles of gaseous exchange, Mechanics of normal respiration, Regulation of respiration, Transport of respiratory gases, Lung function test-clinical significance, Principles of artificial respiration, oxygen therapy, acclimatization at high altitude and decompression sickness. Hypoxia, cyanosis and asphyxia. Haemo-respiratory changes during exercise and role of Yoga. Space physiology.

**Central nervous system** : Organization of nervous system. Functions, types and properties of synapse, reflex and receptors. Motor and sensory pathways and its applied. Connections and functions of cortex, basal ganglia, thalamus, hypothalamus, cerebellum and limbic system. Structure and function of reticular activating system, Mechanism of maintenance of tone, posture and equilibrium, Vestibular apparatus, Higher functions - Memory, Learning, Speech. Parkinsonism. Section of spinal cord, EEG and Sleep, Pain and referred pain. C.S.F., conditioned reflexes. Autonomic nervous system.

**Special senses** : Functional anatomy of eye - Physiology of image formation, colour vision, refractive errors, Visual reflexes-pupillary and light reflex, Effect of lesion for visual pathway. Functional anatomy of ear, properties of sound, mechanism of hearing and deafness. Perception of smell and taste sensation, pathways and its applied. Auditory & visual evoked potential.

**Skin and body temperature regulation** : Mechanism of temperature regulation, Adaptation to altered temperature (heat and cold), Mechanism of fever, cold injuries and heat stroke.

**Physiology of sports, exercise, yoga and meditation** : Cardio-respiratory and metabolic adjustments, Physiological effects of yoga and meditation.

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Pattern of Question Papers:

1. Objective Type Paper
2. Maximum Marks : 100
3. Number of Questions : 100
4. Duration of Paper : Two Hours
5. All Questions carry equal marks
6. There will be Negative Marking

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