

# Rajasthan Public Service Commission, Ajmer

## Syllabus for Screening Test for the post of Sr. Demonstrator-Physiology for Medical & Health Department

Minimum Qualification :- M.B.B.S./M.Sc. (Med. Physiology) for Non Medical Persons.

### **Introduction - Physiological Principles :**

Milieu interior - Maintenance of Internal environment, Feed back Mechanisms.  
Cell as biological unit, Structure and functions of organelles.  
Cell reproduction and differentiation.  
Genetic control of Protein synthesis; cell junctions and  
Transport across cell membrane.

### **Excitable Tissues - Neuromuscular System :**

Membrane potentials and their generation, properties of excitable membrane.  
Structure and function of neuron, classification of nerve fibres and their properties degeneration and regeneration of nerve fibres, nerve metabolism.  
Classification, structure and composition of muscle fibres.  
Morphology of skeletal muscle fibres, mechanism and molecular basis of contraction excitation-contraction coupling, mechanical characteristics of contraction, chronaxie, Rheobase, fatigue, rigor mortis.

### **Neuro-Muscular Transmission :**

Properties of skeletal muscles in intact organisms.  
Electromyography, Reaction of Degeneration, Myopathies, Myasthenia gravis.  
Smooth muscle - morphology, visceral and multiunit Smooth muscle.

### **Blood - Composition, properties and functions of blood :**

Properties and functions of plasma proteins, morphology, functions and fate of cellular components of blood.  
Haemopoiesis and its control, properties, functions and derivatives of haemoglobin haemolysis.  
Measurement and regulation of blood volume.  
Blood groups and blood transfusion.  
Coagulation of blood, coagulants and anticoagulants, bleeding disorders.  
Blood indices. Classification of Anaemias, polycythaemia.  
Structure and functions of reticulo-endothelial system esp. spleen.  
Thymus and immunity; Principles of vaccination.

### **Cardio - Vascular System :**

Historical review.  
Heart structure and properties of cardiac muscle.  
Initiation and conduction of cardiac impulse, cardiac cycle, heart sounds, regulation of function.  
Cardiac output - Measurement and regulation.  
Normal Electrocardiogram significance of various waves of E.C.G.; abnormal rhythms of heart.  
Functions of pericardium.

### **Vascular System :** Structure and functional characteristics

Haemodynamics, blood flow through vessels and its regulation.  
Arterial blood pressure and its regulation, methods of measurement, hypertension and types, physiology of pulmonary and coronary circulation, Myocardial metabolism, ischaemic heart disease (Myocardial Infarction) and physiological basis of its treatment.  
Regional circulations - cerebral, splanchnic, cutaneous and muscular, adaptation exercise.  
Circulatory shock and physiological basis of its treatment.  
Heart failure, cardiac efficiency tests.  
Lymphatic system - formation, composition drainage and functions of lymph.

### **Respiration :**

Functional anatomy of respiratory system, role of pleura, mechanism of respiration pulmonary ventilation.  
Physical principles of gaseous exchange, diffusion.  
Transport of oxygen and carbon dioxide in blood.  
Regulation of respiration. Pulmonary function tests.  
Respiratory insufficiency, cyanosis, decompression sickness, periodic breathing.  
Artificial respiration, oxygen therapy, hyperbaric oxygen.  
Physiological changes at high altitude.  
Haemo-respiratory changes during exercise and role of Yoga.

### **Alimentary System :**

Movement of food through alimentary canal, ingestion of food, motor functions of stomach movements of small intestine, movements of colon, defecation, autonomic reflexes.  
Mechanism, control, regulation, composition and functions of the secretions of (salivary, glands, stomach, pancreas, liver and intestines).  
Digestion and absorption of carbohydrates, proteins and fats, role of bile salts, steatorrhea.  
Absorption of water, minerals, electrolytes and nutrients in small intestines, absorption in large intestines.  
Structure and functions of liver, Gastro-intestinal hormones.  
Assessment of functions of stomach, pancreas and liver. Physiological basis of peptic ulcer constipation, diarrhoea, nausea vomiting and jaundice. Dietary fibre.  
Nutritional requirements in health and in diseased conditions.

### **Body fluids and renal functions :**

Body water and its subdivisions, composition and osmolality of body fluids, regulation of volume and osmolality. Starling's forces and oedema.  
Kidney - structure and functions, renal blood flow, mechanism of urine formation, functions of different parts of nephron, urinary concentration and dilution.  
Concept of plasma clearance, Renal function tests, Acid base balance.  
Haemodialysis -artificial kidney.  
Physiology of micturition.

### **Endocrinal system :**

Neuro-endocrine axis, feed-back control system. Mechanism of hormone action.  
Physiology and clinical conditions associated with pituitary, thyroid, parathyroid, supra islet tissue of Langerhans and pineal body. Local hormones.

### **Reproduction :**

Structure and functions of male and female genital organs.  
Hormonal influences on the organs of reproduction, puberty, spermatogenesis, composition of semen. Ovarian and menstrual cycle, ovulation, hypothalamic pituitary ovarian axis Male and female sexual act, fertilization. Physiology of pregnancy, parturition and lactation Pregnancy tests. Principles of family welfare; oral contraceptives.

### **Central Nervous System :**

Structural and functional organisation, methods of investigation.  
Synapses and synaptic transmission, basic functions of synapses, neuronal pool.  
Anatomical organisation and functions of spinal cord, brain-stem, Vestibular apparatus., cerebellum, thalamus, hypothalamus, basal ganglia and effect of their lesions.  
Spinal, decerebrate and thalamic animals.  
Maintenance of muscle tone, posture and equilibrium. Postural and righting reflexes.  
Cerebral cortex - structure and functional localization, effects of cortical lesions.  
Somato-sensory system - physiology of sensory receptors. Modalities of general sensations sensory pathways and areas, effect of lesions.  
Motor system-levels of control, upper and lower motor neurons, pathways and lesion Babinski's sign.  
Behavioral functions - physiology of limbic system.  
Higher functions - sleep and awakening, electroencephalogram, conditioned and unconditioned reflexes, thoughts and memory, speech and communication, aphasia.  
Functions of cerebral cortex.  
Autonomic Nervous system - General organisation, neurotransmitters, divisions, effects and main functions higher control, receptors and blockers.  
Neurotransmission, effect of related drugs, applied aspects.

**Special sensory System :**

Taste - modalities, receptors, nervous pathway and central connections.

Smell - Odour receptors, nervous pathway and central connections.

Hearing - functional anatomy of ear, transmission of sound, auditory pathway and central connections, pitch and intensity discrimination, localization.

Impairment of hearing. Weber's and Rinne's test, Audiometry.

Vision - functional anatomy of eye, aqueous humour, intraocular pressure. Optics of eye acuity of vision, retinoscopy.

Iris, pupillary reflexes, accommodation, Errors of refraction.

Structure and functions of retina, photochemistry, Colour vision, after images, visual pathways and functions of visual cortex.

Ophthalmoscopy and perimetry.

Binocular vision, movements of eye ball.

**Skin :**

Structure and functions; Body temperature regulation.

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Note :- Pattern of Question Paper

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.