

DETAILED SYLLABUS FOR THE POST OF ASSISTANT PROFESSOR
(PHYSIOLOGY AND BIOCHEMISTRY)

{GOVERNMENT HOMEO MEDICAL COLLEGE}

(Cat.No.: 48/2020)

(Total Marks : 100)

PHYSIOLOGY

General physiology (3 Marks)

Principles of Homeostasis

Structure of cell membrane, Intracellular communication

Mechanism of transport across cell membrane

Body fluid compartment Blood volume

Apoptosis and aging

Body fluids (2 Marks)

Blood-Functions , composition and properties

Plasma proteins

Red Blood Cells-normal RBC count, variations

Haemoglobin-structure, normal hemoglobin content, function, types, abnormal Hb

Iron metabolism

Anaemia - definition, classification, investigations

ESR,PCV and Blood Indices

Hemolysis and fragility of RBC

White Blood Cells - Classification, morphology, life span, properties, functions

Normal total and differential count, variation

Leucopoeiesis

Immunity- Definition, types

Auto immune disorders, AIDS

Platelets - morphology, properties and functions, normal count

Haemostasis- mechanism of coagulation of blood

Bleeding disorders

Blood groups-ABO and Rh systems,

Blood transfusion, indication, precaution, complications, transfusion of blood components

Lymphatic system and lymph

Reticuloendothelial system and tissue macrophage

Cardiovascular system (10 Marks)

Functional anatomy of heart and blood vessels

Properties of cardiac muscle

Cardiac cycle-phases and events in cardiac cycle

General principles of circulation

Heart sounds-definition physiological basis

Radial pulse-normal pulse

ECG- principles of recording, uses of ECG

Cardiac output-Definition, normal value

Heart rate

Arterial blood pressure – systolic and diastolic, normal values, variation

Regional circulation- cerebral, splanchnic, capillary, cutaneous & skeletal muscle circulation

Cardiovascular adjustments during exercise

Respiratory system and environmental physiology (10 Marks)

Organisation and functional anatomy of respiratory system

Mechanism of respiration- ventilation, diffusion of gases. Lung volume and pulmonary function test

Composition of inspired air, alveolar and expired air, partial pressure, gas composition of arterial and venous blood

Regulation of respiration-neural and chemical control

Hypoxia-definition, types clinical features

Cyanosis, Asphyxia, Dyspnoea

Artificial respiration

Deep sea physiology, effects of exercise on respiration

Digestive system (2 Marks)

General organization of G.I tract

Composition and functions of digestive juice

Gastric secretion

Functional anatomy of stomach, pancreas, Liver, Gall bladder, Small intestine, Large intestine

Movements of G.I tract

Gastro intestinal hormones

Role of dietary fibre, bacterial flora

Renal physiology and Skin (3 Marks)

Functions of kidney-homeostasis, as an endocrine organ

Functional anatomy of kidney and urinary tract

Renal circulation

Urine formation, renal clearance, GFR, tubular reabsorption selective secretion, concentration of urine, acidification of urine, Micturition, Diuresis

Skin- body temperature regulation

Hyperthermia, hypothermia, fever, heat strokes

Endocrinology (5 Marks)

Name and organisation of endocrine glands in human body

Pituitary gland-hormones of anterior and posterior pituitary gland

Growth hormone-physiological actions, hypo and hyper functions

Thyroid gland-hormones, biosynthesis, hypo and hyper functions in children and adults

Parathyroid gland- PTH and physiological actions

Pancreas-endocrine functions, hypo and hyper functions

Adrenal gland-adrenocortical hormones, physiological actions of glucocorticoids, mineralocorticoids and sex steroids, adrenal medullary hormones

Other endocrine glands

Reproductive system (10 Marks)

Male reproductive system-testis and its hormones, seminal vesicle, prostate gland, composition of semen, sterility

Female reproductive system - ovulation, ovarian hormones, pituitary gonadotropins, FSH,LH,

Menstrual cycle, menarche, menopause

Pregnancy-fertilization, implantation,

Placenta- functions, hormones

Parturition-physiology of labour

Lactation

Contraception-temporary and permanent methods

Fertility, infertility

Foetal circulation

Central nervous system (7 Marks)

Organisation of nervous system
Functional anatomy of brain and spinal cord
Neuron, neuroglia-functions
Spinal cord-functional anatomy
Synapses-synaptic transmission, neurotransmitters and neuromodulators
Reflex action-reflex arc, components
Somatosensory system and somato motor system
Physiology of pain
Brainstem, Vesicular apparatus
Cerebral cortex
Thalamus – Functions
Hypothalamus
Internal capsule
Basal ganglia – Functions, disorders
Lymbic system
Cerebellum – Posture and equilibrium, Cerebellar lesions
Reticular formation – Functions
Proprioceptors
Higher intellectual functions
EEG and Physiology of sleep – Normal waves clinical uses CSF
Autonomic nerve system

Special senses (3 Marks)

Sensation of smell – Receptor, olfactory pathways
Sensation of taste – taste receptor, taste pathways
Vision – visual pathways, Pupillary reflexions, Errors of refraction, Colour vision, Colour blindness
Ear – Auditory pathways – Mechanisms of hearing, Auditory defects, deafness
Sensation of touch

Nerve Muscle Physiology (2 Marks)

Physiological properties of nerve fibres – Types, classification, function, degeneration and degeneration of peripheral nerves.
Neuron – Structure of typical neuron, types, properties of functions
Neuromuscular junction
Physiology of skeletal muscle
Physiology of cardiac muscle

Physiology of smooth muscle
EMG and disorders of skeletal muscle

Biophysical Sciences (3 Marks)

Filtration
Ultra filtration
Osmosis
Diffusion
Adsorption
Hydrotropy
Colloid
Donnan equilibrium
Tracer elements
Dialysis
Absorption
Assimilation
Surface tension

BIOCHEMISTRY

Carbohydrates (10 Marks)

Chemistry-classification, biological importance of monosaccharides, disaccharides, polysaccharides

Metabolism-Digestion and absorption of carbohydrates, Glycolysis, Gluconeogenesis, glycogen synthesis, Glycogen degradation, TCA, HMP, Blood Glucose Regulation, FBS, PPBS, RBS, Diabetes Mellitus, Acute and chronic complications, Estimation of blood glucose, Glycated Haemoglobin, Metabolic syndrome

Lipid (5 Marks)

Lipid Chemistry –Phospholipids, Essential fatty acids, PUFA – Functions of PUFA
Metabolism - Digestion and absorption of lipid, Beta oxidation of fatty acids, cholesterol, lipoproteins – functions of lipoproteins, apoproteins, lipid profile, Causes of fatty liver

Protein (5 Marks)

Protein Chemistry, essential amino acids,
Metabolism – digestion and absorption of proteins, formation and fate of ammonia, urea cycle, hyperammonemia,
Phenyl ketonuria, alkaptonuria

Enzymes (3 Marks)

Definition, classification, Km value and its significance, different types of enzyme inhibition, Liver profile enzymes, Bone specific enzymes, cardiac biomarkers, Pancreatic markers

Vitamins (5 Marks)

Fat soluble vitamins – daily requirement, dietary source, biological functions, deficiency disorders

Water soluble vitamins – Thiamin, Vitamin B6, B12, Niacin, Vitamin C, daily requirement, dietary source, Biological functions, deficiency disorders

Minerals (2 Marks)

Calcium – regulation of blood calcium level, Phosphorus, Iron – Iron metabolism, Selenium, Copper, Fluoride, Sodium, Potassium – Biological functions, reference level, hypo and hyper conditions

Organ Function tests (10 Marks)

Liver Function Test, Jaundice – Classification of Jaundice, Lab investigations in Jaundice, Heme catabolism, Vanden Bergh test, Renal Function Test, Urine -normal volume constituents, abnormal constituents, Thyroid Function Test

NOTE: - It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper.