Sri Guru Ram Das University of Health Sciences, Sri Amritsar

Department of Physiology

Theory Paper A			Theory Paper B	
Topics	**Marks Distribution**		**Topics**	**Marks Distribution**
Central Nervous System	29		Cardiovascular Physiology	26
Endocrine Physiology	19		Haematology	19
Nerve Muscle Physiology	15		Respiratory Physiology	15
Reproductive Physiology	15		Gastrointestinal Physiology	15
Special Senses	10		Renal Physiology	15
General Physiology	7		Integrated Physiology	5
AETCOM (module 1.2**)**	5		**AETCOM (**module 1.3)	5
TOTAL	**100**		**TOTAL**	**100**

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PHYSIOLOGY (Topics = 12, Competencies = 136)							
	Topic 1: General Physiology	**Number of competencies: (7)**			**Number of competencies that require certification : (NIL)**		
PY1.1	Describe the structure and functions of a cell, intercellular communication and their applications in Clinical care and research	K	KH	Y	LGT	Written/Viva voce	
PY1.2	Discuss the principles of homeostasis and feedback mechanism	K	KH	Y	LGT	Written/Viva voce	
PY1.3	Describe apoptosis (programmed cell death) , explain its mechanism of action and physiological significance.	K	KH	Y	LGT SGT	Written/Viva voce	
PY1.4	Describe and discuss various transport mechanisms across cell membranes	K	KH	Y	LGT Student Seminar	Written/Viva voce/Assignments	
PY1.5	Describe the fluid compartments of the body, its ionic composition & measurement methods	K	KH	Y	LGT	Written/Viva voce	
PY1.6	Describe the concept of pH & Buffer systems in the body	K	KH	Y	LGT SGT	Written/Viva voce	
PY1.7	Describe the molecular basis of resting membrane potential (RMP) and generation of action potential in a nerve fibre	K	KH	Y	LGT SGT/Tutorial	Written/Viva voce	
	Topic 2: Haematology	**Number of competencies: (13)**			**Number of competencies that require certification : (01)**		
PY2.1	Describe the composition and functions of blood and its components	K	KH	Y	LGT SGT	Written/Viva voce	
PY2.2	Discuss the origin, forms, variations and functions of plasma proteins and its clinical implications	K	KH	Y	LGT SGT	Written/Viva voce	
PY2.3	Describe the physiological structure, synthesis , functions and breakdown of Hemoglobin. Discuss its variants and clinical significance.	K	KH	Y	LGT SGT	Written/Viva voce	
PY2.4	Describe Erythropoiesis & discuss its regulation in physiological and pathological situations	K	KH	Y	LGT SGT	Written/Viva voce	
PY2.5	Describe anaemias, polycythemia & jaundice and discuss its physiological principles of management	K	KH	Y	LGT SGT, Student Seminar, ECE	Written/Viva voce	
PY2.6	Describe the formation of WBC (Leucopoiesis), structure and function of various WBC types and their regulatory mechanisms	K	KH	Y	LGT SGT	Written/Viva voce	

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PY2.7	Discuss 'Immunity' in terms of its types, development, regulation and physiological significance	K	KH	Y	LGT SGT/Tutorials	Written/Viva voce	
PY2.8	Describe the formation of platelets (thrombopoiesis), structure, functions and variations.	K	KH	Y	LGT SGT	Written/Viva voce	
PY2.9	Describe hemostasis, coagulation pathways, mechanism of action of anticoagulants and briefly discuss pathophysiological aspects of bleeding & clotting disorders (e.g. hemophilia, purpura)	K	KH	Y	LGT SGT, ECE- Visit to blood bank Flipped Classroom	Written/Viva voce	
PY2.10	Discuss types of blood groups, clinical importance of blood grouping, blood banking and transfusion	K	KH	Y	LGT SGT,ECE- Visit to blood bank	Written/Viva voce	
PY2.11	Estimate Hb, RBC, TLC, DLC, Blood groups, BT/CT, RBC indices	S	SH	Y	DOAPs	Practical/OSPE/Viva voce	01 EACH
PY2.12	Describe the test to measure Erythrocyte Sedimentation Rate (ESR), Osmotic fragility, Hematocrit, and interpret its findings	K	KH	Y	Demonstration	Written /Viva voce/OSPE (Question station)	
PY2.13	Describe steps for reticulocyte and platelet count	K	KH	Y	Demonstration	Written /Viva voce	
	Topic 3: Nerve and Muscle Physiology	**Number of competencies: (12)**			**Number of competencies that require certification : (01)**		
PY3.1	Describe the structure and functions of a neuron and neuroglia; Discuss nerve growth factors	K	KH	Y	LGT	Written/Viva voce	
PY3.2	Describe the types, functions, properties of nerve fibers including strength duration curve, chronaxie and rheobase	K	KH	Y	LGT	Written/Viva voce	
PY3.3	Classify nerve injury and discuss the mechanism of degeneration and regeneration in peripheral nerves	K	KH	Y	LGT	Written/Viva voce	
PY3.4	Describe the microscopic structure of neuro-muscular junction (NMJ) and mechanism of neuromuscular transmission	K	KH	Y	LGT SGT	Written/Viva voce	
PY3.5	Discuss the applied aspects of neuromuscular junction : myasthenia gravis, Lambert Eaton syndrome and neuromuscular blocking agents.	K	KH	Y	LGT SGT, ECE (classroom / hospital setting)	Written/Viva voce	
PY3.6	Describe the different types of muscle fibres, their structure and physiological basis of action potential	K	KH	Y	LGT	Written/Viva voce	

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PY3.7	Describe properties, action potential and molecular basis of muscle contraction in skeletal muscle	K	KH	Y	LGT SGT Flipped Classroom	Written/Viva voce	
PY3.8	Describe properties, action potential and molecular basis of muscle contraction in smooth muscle	K	KH	Y	LGT SGT	Written/Viva voce	
PY3.9	Describe the mode of muscle contraction (isometric and isotonic), energy source, muscle metabolism and gradation of muscular activity	K	KH	Y	LGT	Written/Viva voce	
PY3.10	Enumerate and briefly discuss myopathies	K	KH	Y	LGT SGT	Written/Viva voce	
PY3.11	Perform Ergography and calculate the work done by a skeletal muscle	S	SH	Y	DOAPs	Practical/OSPE/Viva voce	01 EACH
PY3.12	Observe with Computer assisted learning (i) Amphibian nerve -muscle experiments (ii) Amphibian cardiac experiments	S	SH	Y	DOAPs	Practical/OSPE/Viva voce	
	Topic 4: Gastro-intestinal Physiology	**Number of competencies: (12)**			**Number of competencies that require certification : (01)**		
PY4.1	Describe the functional anatomy of digestive system	K	KH	Y	LGT SGT	Written/Viva voce	
PY4.2	Enumerate various Gastrointestinal hormones (GI) hormones, discuss their functions and regulation	K	KH	Y	LGT SGT	Written/Viva voce	
PY4.3	Describe the composition, mechanism of secretion, functions, and regulation of saliva	K	KH	Y	LGT SGT	Written/Viva voce	
PY4.4	Describe the composition, mechanism of secretion, functions, and regulation of gastric juice. Discuss various gastric function tests	K	KH	Y	LGT	Written/Viva voce	
PY4.5	Describe the composition, mechanism of secretion, functions, and regulation of pancreatic juice including various pancreatic exocrine function tests	K	KH	Y	LGT	Written/Viva voce	
PY4.6	Describe the composition, mechanism of secretion, functions, and regulation of intestinal juices	K	KH	Y	LGT	Written/Viva voce	
PY4.7	Describe the physiology of digestion and absorption of nutrients	K	KH	Y	LGT SGT	Written/Viva voce	
PY4.8	Describe GIT movements, its regulation and physiological significance including defecation reflex and the role of dietary fibres	K	KH	Y	LGT SGT Flipped Classroom	Written/Viva voce	

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PY4.9	Describe the structure , functions and secretion of liver and gallbladder with elaboration of various liver function tests	K	KH	Y	LGT SGT	Written/Viva voce	
PY4.10	Describe the Gut-Brain Axis and its physiological significance	K	KH	Y	LGT SGT,	Written/Viva voce	
PY4.11	Discuss (in brief) the applied physiology of GIT viz. Peptic ulcer, gastroesophageal reflux disease, vomiting, diarrhoea, constipation, Adynamic ileus, Hirschsprung's disease	K	KH	Y	LGT SGT, ECE, SDL	Written/Viva voce	
PY4.12	Obtain relevant history and conduct correct General and Clinical examination of the abdomen in a normal volunteer or simulated environment	S,A,C	SH	Y	DOAP (Simulation or real life setting)	Skill assessment/ Viva voce/OSCE	1
Topic 5: Cardiovascular Physiology		**Number of competencies: (16)**			**Number of competencies that require certification : (03)**		
PY5.1	Describe the functional anatomy of heart including chambers and coronary circulation	K	KH	Y	LGT	Written/Viva voce	
PY5.2	Describe the properties of cardiac muscle including its morphology, electrical, mechanical and metabolic functions	K	KH	Y	LGT SGT	Written/Viva voce	
PY5.3	Describe generation and conduction of cardiac impulse along with the conduction pathway (including pacemaker potential).	K	KH	Y	LGT SGT	Written/Viva voce	
PY5.4	Discuss the physiological events occurring during the cardiac cycle, concurrent pressure volume changes, generation of heart sounds and murmur	K	KH	Y	LGT SGT Flipped Classroom	Written/Viva voce	
PY5.5	Describe the physiology of electrocardiogram (E.C.G), the cardiac axis and its applications	K	KH	Y	LGT SGT, ECE	Written/Viva voce/OSCE (Question station)	
PY5.6	Discuss physiological variations in ECG waveforms, abnormal waveforms and intervals , arrhythmias, heart blocks and myocardial Infarction	K	KH	Y	LGT SGT/Student seminars/ECE	Written/Viva voce	
PY5.7	Discuss haemodynamics of circulatory system	K	KH	Y	LGT SGT/Tutorials	Written/Viva voce	
PY5.8	Describe and discuss local and systemic cardiovascular regulatory mechanisms	K	KH	Y	LGT SGT	Written/Viva voce	
PY5.9	Describe heart rate, factors affecting heart rate, and its regulation	K	KH	Y	LGT SGT	Written/Viva voce	

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PY5.10	Describe cardiac output, factors affecting cardiac output and its regulation.	K	KH	Y	LGT SGT	Written/Viva voce	
PY5.11	Describe blood pressure, factors affecting blood pressure and its regulation	K	KH	Y	LGT SGT/Student seminars	Written/Viva voce	
PY5.12	Describe & discuss regional circulation including microcirculation, lymphatic circulation, cerebral, capillary, skin, foetal, pulmonary and splanchnic circulation	K	KH	Y	LGT SGT	Written/Viva voce	
PY5.13	Describe the patho-physiology of shock, syncope heart failure with physiological basis of its management	K	KH	Y	LGT SGT / Student seminars	Written/Viva voce	
PY5.14	Record blood pressure & pulse at rest and in different grades of exercise and postures in a volunteer or simulated environment	S	SH	Y	DOAPs (Simulation or real life setting)	Practical/OSPE/ Viva voce	3
PY5.15	Record and interpret normal ECG in a volunteer or simulated environment	S	SH	Y	DOAPs (Simulation or real life setting)	Practical/OSPE/ Viva voce	1
PY5.16	Obtain relevant history and conduct General and Clinical examination of the cardiovascular system in a normal volunteer or simulated environment	S,A,C	SH	Y	DOAPs	Skill assessment/ Viva voce/OSCE	1
	Topic 6: Respiratory Physiology	**Number of competencies: (13)**			**Number of competencies that require certification : (02)**		
PY6.1	Describe the functional anatomy of respiratory tract and non-respiratory functions of lungs	K	KH	Y	LGT SGT	Written/Viva voce	
PY6.2	Describe the mechanics of normal respiration, pressure changes during ventilation, lung volume and capacities (Static and Dynamic)	K	KH	Y	LGT SGT	Written/Viva voce	
PY6.3	Describe the alveolar surface tension, compliance, airway resistance, ventilation, V/P ratio, diffusion capacity of lungs	K	KH	Y	LGT SGT	Written/Viva voce	
PY6.4	Discuss the transport of respiratory gases viz Oxygen and Carbon dioxide across lungs and whole body	K	KH	Y	LGT	Written/Viva voce	
PY6.5	Describe the chemoreceptors (peripheral and central) and neural centres of respiration including chemical and neural regulation of respiration	K	KH	Y	LGT	Written/Viva voce	

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PY6.6	Describe and discuss the pathophysiology of dyspnoea, hypoxia, cyanosis, asphyxia, drowning, periodic breathing and oxygen therapy	K	KH	Y	LGT SGT	Written/Viva voce	
PY6.7	Discuss various lung function tests and their clinical significance in obstructive and restrictive lung diseases	K	KH	Y	LGT SGT, Tutorials Flipped Classroom	Written/Viva voce	
PY6.8	Discuss the physiology of high altitude and acclimatization	K	KH	Y	LGT	Written/Viva voce	
PY6.9	Discuss the physiology of deep sea diving and decompression sickness	K	KH	Y	LGT	Written/Viva voce	
PY6.10	Perform Spirometry and interpret the findings (Digital / Manual)	S	P	Y	DOAPs	Skill assessment/ Viva voce/OSCE	1
PY6.11	Describe principles and methods of artificial respiration	S	SH	Y	DOAPs	Practical/OSPE/ Viva voce	
PY6.12	Obtain relevant history and conduct correct General and Clinical examination of the respiratory system in a normal volunteer or simulated environment	S,A,C	SH	Y	DOAPs	Practical/OSPE/ Viva voce	1
PY6.13	Demonstrate the correct technique to perform measurement of peak expiratory flow rate in a normal volunteer or simulated environment	S	SH	Y	DOAPs	Practical/OSPE/ Viva voce	
Topic 7: Renal Physiology		**Number of competencies: (9)**			**Number of competencies that require certification : (NIL)**		
PY7.1	Describe the functional anatomy of kidney and non-excretory functions of kidney	K	KH	Y	LGT SGT	Written/Viva voce	
PY7.2	Describe the structure and functions of juxta glomerular apparatus and role of renin-angiotensin system	K	KH	Y	LGT	Written/Viva voce	
PY7.3	Describe the mechanism of urine formation involving processes of filtration (Glomerular filtration), tubular reabsorption & secretion.	K	KH	Y	LGT SGT, Student Seminar	Written/Viva voce	
PY7.4	Describe the mechanism of urine concentration and dilution (Counter current Multiplier & Exchanger)	K	KH	Y	LGT SGT Flipped Classroom	Written/Viva voce	
PY7.5	Describe the renal regulation of fluid and electrolytes & acid-base balance	K	KH	Y	LGT SGT	Written/Viva voce	
PY7.6	Describe the innervations of urinary bladder, physiology of micturition and its abnormalities	K	KH	Y	LGT SGT	Written/Viva voce	

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PY7.7	Describe cystometry and discuss the normal cystometrogram	K	KH	Y	LGT SGT	Written/Viva voce	
PY7.8	Discuss various Renal Function Tests with its physiological significance and clinical implication of Renal clearance	K	KH	Y	LGT SGT, ECE (classroom / hospital setting)	Written/Viva voce	
PY7.9	Discuss the role of artificial kidneys, dialysis and indications of renal transplant	K	KH	Y	LGT	Viva voce	
	Topic 8: Endocrine Physiology	**Number of competencies: (7)**			**Number of competencies that require certification : (NIL)**		
PY8.1	Describe the functional anatomy of endocrine glands, mechanism of hormonal action (steroid and peptide) and hypothalamus pituitary axis {HPA}	K	KH	Y	LGT Flipped Classroom	Written/Viva voce	
PY8.2	Describe the synthesis, secretion, transport, physiological actions, regulation and effect of altered (hypo and hyper) secretion of pituitary gland	K	KH	Y	LGT SGT	Written/Viva voce	
PY8.3	Describe the synthesis, secretion, transport, physiological actions, regulation and effect of altered (hypo and hyper) secretion of thyroid gland including thyroid function tests	K	KH	Y	LGT SGT, ECE	Written/Viva voce	
PY8.4	Describe the synthesis, secretion, transport, physiological actions, regulation and effect of altered (hypo and hyper) secretion of adrenal gland and its function tests	K	KH	Y	LGT SGT	Written/Viva voce	
PY8.5	Describe the synthesis, secretion, transport, physiological actions, regulation and effect of altered (hypo and hyper) secretion of parathyroid gland with emphasis of physiology of bone and calcium metabolism	K	KH	Y	LGT SGT/Tutorials	Written/Viva voce	
PY8.6	Describe the synthesis, secretion, transport, physiological actions, regulation and effect of altered (hypo and hyper) secretion of pancreatic gland including pancreatic function tests	K	KH	Y	LGT SGT	Written/Viva voce	
PY8.7	Describe the physiology of Thymus & Pineal Gland	K	KH	Y	LGT	Written/Viva voce	
	Topic 9: Reproductive Physiology	**Number of competencies: (10)**			**Number of competencies that require certification : (NIL)**		

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PY9.1	Explain sex determination, sex differentiation and their abnormalities and discuss the effects of removal of gonads on physiological functions	K	KH	Y	LGT SGT	Written/Viva voce	
PY9.2	Describe and discuss puberty: onset, progression, stages; early and delayed puberty.	K	KH	Y	LGT SGT	Written/Viva voce	
PY9.3	Describe the functional anatomy of male reproductive system, functions of testis, spermatogenesis and discuss the functions and regulations of testosterone hormone	K	KH	Y	LGT SGT	OSPE/Viva voce	
PY9.4	Describe the functional anatomy of female reproductive system: functions of ovary and its hormones (estrogen and progesterone) ; hormonal regulation by hypothalamic pituitary gonadal (HPG axis)	K	KH	Y	LGT SGT , Student Seminar	Written/Viva voce	
PY9.5	Discuss the menstrual cycle, uterine and ovarian changes, hormonal regulation and its implications in reproductive physiology	K	KH	Y	LGT SGT, ECE	Written/Viva voce	
PY9.6	Enumerate male and female contraceptive methods, rationale of its prescription, side effects and its advantages & disadvantages	K	KH	Y	LGT SGT, ECE,SDL	Written/Viva voce	
PY9.7	Discuss the physiology of pregnancy, parturition & lactation.	K	KH	Y	LGT SGT, Flipped Classroom	Written/Viva voce	
PY9.8	Discuss the physiological basis of various pregnancy tests	K	KH	Y	LGT SGT	Written/Viva voce	
PY9.9	Discuss the hormonal changes and their effects during perimenopause and menopause	K	KH	Y	LGT SGT	Written/Viva voce	
PY9.10	Discuss the common causes of infertility in a couple and role of IVF in managing a case of infertility	K	KH	Y	LGT SGT, visit to IVF lab	Written/Viva voce	
	Topic 10: Central Nervous System Physiology	**Number of competencies: (20)**			**Number of competencies that require certification : (02)**		
PY10.1	Describe and discuss the functional organization of central nervous system (brain and spinal cord)	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.2	Describe the functional anatomy of peripheral nervous system (including autonomic nervous system)	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.3	Classify the neurotransmitters and discuss the chemical transmission in the nervous system.	K	KH	Y	LGT SGT	Written/Viva voce	

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PY10.4	Discuss the classification, functions and properties of synapse	K	KH	Y	LGT SGT ,Student Seminar	Written/Viva voce	
PY10.5	Discuss the classification, functions and properties of reflex	K	KH	Y	LGT SGT, Student Seminar	Written/Viva voce	
PY10.6	Discuss the classification, functions and properties of receptors	K	KH	Y	LGT SGT , Student Seminar	Written/Viva voce	
PY10.7	Discuss somatic sensations, ascending tracts, (sensory tracts) and applied aspects of sensory system	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.8	Discuss Physiology of pain including pain pathways and its modulation with special emphasis on gate control theory of pain	K	KH	Y	LGT SGT, visit to pain clinic	Written/Viva voce	
PY10.9	Describe the course of descending tracts (pyramidal and extra pyramidal), its clinical implications including difference in Upper motor neuron (UMN)and lower motor neuron (LMN) lesions	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.10	Discuss types and clinical features of spinal cord lesions (complete, incomplete transection and hemisection - Brown Sequard syndrome)	K	KH	Y	LGT SGT, Tutorials, ECE	Written/Viva voce	
PY10.11	Describe functional anatomy of cerebellum, its connections, functions and clinical abnormalities .	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.12	Discuss functional anatomy of basal ganglia , its connections, functions and Clinical abnormalities .	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.13	Discuss the mechanism of maintenance of tone, posture and control of body movements	K	KH	Y	LGT SGT Flipped Classroom	Written/Viva voce	
PY10.14	Discuss functional anatomy of thalamus , its connections, functions and clinical abnormalities .	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.15	Discuss functional anatomy of hypothalamus and limbic system , its connections, functions and clinical abnormalities .	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.16	Discuss functional anatomy of cerebral cortex, its connections, functions and Clinical abnormalities	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.17	Discuss the structure and functions of reticular activating system, sleep physiology and EEG waveforms during sleep wake cycle	K	KH	Y	LGT SGT, visit to sleep lab	Written/Viva voce	

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PY10.18	Discuss the physiological basis of memory, learning and speech and clinical alterations in speech	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.19	Obtain relevant history and conduct correct General and Clinical examination of the nervous system: Higher functions, sensory system, motor system, reflexes in a normal volunteer or simulated environment	S	SH	Y	DOAPs	Skill assessment/ Viva voce/OSCE	4 (each)
PY10.20	Obtain relevant history and conduct correct General and Clinical examination of the cranial nerves in a normal volunteer or simulated environment	S	P	Y	DOAPs	OSCE/Viva voce	1 (each)
	Topic 11: Special Senses	**Number of competencies: (7)**			**Number of competencies that require certification : (NIL)**		
PY11.1	Describe and discuss physiology of smell and its applied aspects	K	KH	Y	LGT SGT	Written/Viva voce	
PY11.2	Describe and discuss physiology of taste sensation and applied aspects	K	KH	Y	LGT SGT	Written/Viva voce	
PY11.3	Describe and discuss functional anatomy of ear and auditory pathways, vestibular apparatus and equilibrium	K	KH	Y	LGT SGT	Written/Viva voce	
PY11.4	Discuss physiology of hearing, pathophysiology of deafness and hearing tests	K	KH	Y	LGT SGT	Written/Viva voce	
PY11.5	Discuss functional anatomy of eye, visual pathway, light and pupillary reflex and clinical implication of lesions in visual pathway	K	KH	Y	LGT SGT	Written/Viva voce	
PY11.6	Discuss physiology of image formation, refractive errors and physiological principles of its management	K S	P	Y	LGT SGT ECE	Written/Viva voce	
PY11.7	Discuss physiology of vision including colour vision and colour blindness	K	KH	Y	LGT SGT Flipped Classroom	Written/Viva voce	
	Topic 12: Integrated Physiology	**Number of competencies: (10)**			**Number of competencies that require certification : (NIL)**		
PY12.1	Describe physiological mechanism of temperature regulation	K	KH	Y	LGT SGT	Written/Viva voce	
PY12.2	Discuss adaptation to altered temperature (heat and cold) and mechanism of fever, cold injuries and heat stroke	K	KH	Y	LGT SGT	Written/Viva voce	
PY12.3	Discuss cardio-respiratory and metabolic adjustments during exercise (isometric and isotonic), effects of physical training under different environmental conditions (heat and cold)	K	KH	Y	LGT SGT	Written/Viva voce	

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PY12.4	Discuss physiological consequences of sedentary lifestyle; metabolic and endocrinal consequences of obesity & metabolic syndrome.	K	KH	Y	LGT SGT	Written/Viva voce	
PY12.5	Describe physiology of Infancy, Interpret growth charts and anthropometric assessment of infants	K	KH	Y	LGT SGT, ECE	Written/Viva voce	
PY12.6	Describe and discuss physiology of aging, role of free radicals and antioxidants	K	KH	Y	LGT SGT	Written/Viva voce	
PY12.7	Discuss the concept, criteria for diagnosis of Brain death and its implications	K	KH	Y	Small group teaching	Practical/OSPE/ Viva voce	
PY12.8	Discuss the physiology of yoga and meditation	K	KH	Y	Small group teaching	Practical/OSPE/ Viva voce	
PY12.9	Obtain history and perform general examination in the volunteer / simulated environment	S	SH	Y	DOAPs	Skill assessment/ Viva voce/OSCE	
PY12.10	Demonstrate Basic Life Support in a simulated environment	S	SH	Y	DOAPs, Simulation lab (Simulation or real life setting)	Skill assessment/ Viva voce/OSCE	

Department of Physiology

Guidelines for question paper as per the Medical Council of India, Competency Based Undergraduate Curriculum for Indian Medical Graduate.

Theory paper should include questions from core competencies and not from Non Core Competency

BLUEPRINT OF THEORY PAPER

Sr. No.	Type	Explanation	Topics	Distribution of marks as per weightage
1.	MCQ		**10 MCQs for Paper A** **10 MCQs for Paper B**	2 X 10 = 20 2 X 10 = 20
2.	Long essay question	1. The question should pose a Clinical/ Practical problem to the students and require them to apply knowledge and integrate it with disciplines. Avoid giving one liners as questions. 2. Avoid giving one liners as questions. 3. The question stem should be structured and marking distribution should be provided. 4. Use action verbs from higher domains as given in this document.	**Paper A (One Question)** 1. Structured Question from core competencies of Topic (**Central Nervous System**) in Paper A **Paper B (Two Questions)** 1. Structured Question from core competencies of Topic (**Cardio Vascular System**) in Paper B	1 X 10= 10 1 X 10= 10
3.	Reasoning Questions	These provide excellent opportunities for testing integration, clinical reasoning and analytic ability of the student.	**Paper A (5 Questions)** From Core Competencies of all topics except (General Physiology) as per competency based undergraduate curriculum for the Indian Medical Graduate, VOLUME 1	5 X 3 = 15

			Paper B (5 Questions) From Core Competencies of all topics except (Integrated Physiology) as per competency based undergraduate curriculum for the Indian Medical Graduate, VOLUME 1	5 X 3 = 15
4.	Short Notes (Applied Questions)	Questions on applied aspect From six integrated modules.	**Paper A (4 Questions)** From Core Competencies as per competency based undergraduate curriculum for the Indian Medical Graduate, VOLUME 1 **At least 2 sub-parts from all (Thyroid, Diabetes) integrated modules** **Paper B (4 Questions)** From Core Competencies as per competency based undergraduate curriculum for the Indian Medical Graduate, VOLUME 1 **At least 2 sub-parts from all (Anaemia, TB, Hypertension, IHD) integrated modules**	4 X 5 = 20 4 X 5 = 20
5.	Short Notes	These provide opportunity to sample a wider content, albeit in a short time. The questions should be task oriented rather than 'Write a short note on xxx'. Preferably use verbs (as per List attached) in framing questions and structure them as far as possible	**Paper A (3 Questions)** From Core Competencies as per competency based undergraduate curriculum for the Indian Medical Graduate, VOLUME 1 One each from CNS, NMP, Reproductive Physiology) **Paper B (3 Questions)** From Core Competencies as per competency based undergraduate curriculum for the Indian Medical Graduate, VOLUME 1 One each from GIT, Renal, Integrated Physiology	3 X 5 = 15 3 X 5 = 15

6.	Short notes + AETCOM module	These provide opportunity to sample a wider content, albeit in a short time. The questions should be task oriented rather than 'Write a short note on xxx'. Preferably use verbs (as per List attached) in framing questions and structure them as far as possible	**Paper A (3 Questions + AETCOM module 1.2)** NMP, General Physiology, Special Senses **Paper B (3 Questions + AETCOM module 1.3)** Haematology, Respiratory Physiology, Renal Physiology	4 x 5 = 20 4 x 5 = 20

Total Marks 200(Paper A- 100 marks, Paper B-100 marks)

Blueprinting in knowledge domain
(Representative example only. Actual figures may vary with the subject and phase)

Level	Topic A	Topic B	Topic C	Topic D	Total
Knowledge	1	2	1	1	5(20%)
Comprehension	1	1	1	2	5(20%)
Application	2	1	1	1	5(20%)
Analysis	1	1	2	2	6(24%)
Synthesis		1		1	2(8%)
Evaluation	1		1		2(8%)
Total	6(24%)	6(24%)	6(24%)	7(28%)	25(100%)

Verbs in various levels in Knowledge domain (Bloom's taxonomy)

Knowledge	Define, Describe, Draw, Find, Enumerate, Cite, Name, Identify, List, label, Match, Sequence, Write, State, Choose ,Indicate, isolate, Order, Recognize, Underline
Comprehension	Discuss, Conclude, Articulate, Associate, Estimate, Rearrange, Demonstrate understanding, Explain, Generalise, Identify, Illustrate, Interpret, Review, Summarise, Extrapolate, Update
Application	Apply, Choose, Compute, Modify, Solve, Prepare, Produce, Select, Show, Transfer, Use
Analysis	Analyse, Characterise, Classify, Compare, Contrast, Debate, Diagram, Differentiate, Distinguish, Relate, Categorise
Synthesis	Compose, Construct, Create, Verify, Determine, Design, Develop, Integrate, Organise, Plan, Produce, Propose, rewrite
Evaluation	Appraise, Assess, Conclude, Critic, Decide, Evaluate, judge, Justify, Predict, Prioritise, Prove, Rank

The question part of the MCQ (item) is called STEM; correct answer is called the KEY and the rest of the options are called DISTRACTORS.

Steps in writing:

1. Select the specific learning objectives which you want to test.
2. Write the stem, it should be self-explanatory and complete, avoid using terms like (NOT, EXPECT, NEVER, ALWAYS, SOMETIMES) in the stem, if the terms are being used they should be in UPPERCASE and **bold** letter.
3. Write unambiguous and unarguably the correct answer to the stem.
4. Select the most plausible alternatives and arrange them in the form of options.
5. Avoid window dressing of the stem. This means adding superfluous and unnecessary words which confuses the student.
6. Abbreviations should be avoided.
7. Options should be grammatically parallel to the key, and should be parallel and have the same relation to the stem.
8. When writing options, avoid duplications or making options all inclusive, e 1-6, 6-10 etc.
9. The options should be arranged in rank order, eg. 256, 266, 280, 290 and not 290, 266, 280, 256.
10. “All the above” and “None of the above” should be avoided as an option.

Distribution of Marks: - Physiology

Papers		Maximum Marks	Minimum Passing Marks
Theory (Summative Assessment) (100 +100=200 Marks)	Theory Paper I(Sample paper Attached)	100	Mandatory to get 40% marks separately in theory and in practical and with minimum 50% in aggregate for theory plus practical.
	Theory paper II(Sample paper Attached)	100	
Practical *(Summative Assessment) (60 + 40= 100 Marks) 1. Practical/clinical examinations will be conducted in the laboratories and /or hospital wards. The objective will be to assess proficiency and skills to conduct experiments, interpret data and form logical conclusion.) 2. Viva/oral examination should assess approach to patient management, emergencies, attitudinal, ethical and professional values. Candidate's skill in interpretation of common investigative data, X-rays, identification of specimens, ECG, etc. is to be also assessed.	**1. Clinical** a. Clinical Examination Discussion b. Human Experiment Discussion c. Spotters d. OSPE Components	40	
	2. Hematology a. Major Haemotology Discussion b. Minor Haemotology Discussion c. Spotters OSPE Components	40	
	Viva (oral examination should focus on the application and interpretation) Charts, Graphs, topics covered in ECE, Photograph & Instrument etc	20	
Internal Assessment (Not added to the marks of the university examinations and should be shown separately in the grade card)	Theory	100	50% Combined in theory and practical (not less than 40% in each for eligibility for appearing for university examination
	Practical	100	

*** During practical examinations assessment tools are not limited to above mentioned methods; you can use other methods also to improve authenticity. Please refer to competency based assessment module for UG medical education for more examples of methods. Also includes topics covered in ECE.**

Formative & Internal Assessment:- Internal assessment shall be based on day-to-day assessment. Efforts should be made to use multiple tools even for a given competency to improve validity and reliability of assessment

It shall relate to different ways in which learners participate in learning process which is day to day recorded in record book and log book in the form of :-

a) Assignments,
b) Preparation for seminar,
c) Clinical case presentation,
d) Preparation of clinical case for discussion,
e) Clinical case study/problem solving exercise participation in project for health care in the community,
f) Proficiency in carrying out a practical or a skill in small research project etc.

Regular periodic examination shall be conducted throughout the course as per following schedule:-

SRI GURU RAM DAS INSTITUTE OF MEDICAL SCIENCES & RESEARCH												
DEPARTMENT OF ANATOMY / PHYSIOLOGY/ BIOCHEMISTRY												
MBBS	**Year/phase 1st Prof. Phase-I**						**Session --**					**Cumulative percent of Theory & Practical**
			Formative Assessment				**Continuous Internal Assessment (Theory)**					
S.No.	**Roll No.**	**Name of Student**	**1st PCT Theory**	**2nd PCT Theory**	**Prelims theory Paper I and II**	**Send up**	**Assignments**	**Seminars/ Class Test**	**Attendance (Theory)**	**Total**	**Percentage Theory (Minimum cut off 40%)**	**Theory + Practical=100+100=200 (Minimum cut off 50%)**
			10	**10**	**15**	**30**	**15**	**15**	**05**	**100**		
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SRI GURU RAM DAS INSTITUTE OF MEDICAL SCIENCES & RESEARCH											
DEPARTMENT OF ANATOMY / PHYSIOLOGY/ BIOCHEMISTRY											
MBBS	**Year/phase 1st Prof. Phase-I**								**Session --**		
			Formative Assessment			**Continuous Internal Assessment (Practical)**					
S.No.	**Roll No.**	**Name of Student**	**1st PCT Practical**	**2nd PCT Practical**	**Send up**	**Log Book**	**AETCOM**	**Case Base Discussion / Viva/ Museum**	**Attendance (Practical)**	**Total**	**Percentage Practical (Minimum cut off 40%)**
			10	**10**	**15**	**30**	**15**	**15**	**05**	**100**	
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SRI GURU RAM DAS UNIVERSITY OF HEALTH SCIENCES, SRI AMRITSAR

Maximum Marks: 100 | **MBBS 1st Professional Examination** | Time: 3 Hours

(Session Oct/Nov 2025)

Subject- Physiology (New Scheme)

Paper-A

Note:
1. Attempt all questions. Illustrate your answer with suitable diagrams where applicable.
2. Question No. I (Multiple Choice Questions (1-10)) is to be attempted on OMR Sheet in first 15 minutes of the start of exam.
3. Question No. II-VI are to be attempted on the main answer book. No supplementary sheet shall be provided.
4. Students must write QP code in the space provided on OMR sheet as well as on the title page of the main answer book.

QP Code: MBN103A

Multiple Choice Questions (MCQs): [10X2=20]

I.

1. A 45 years old female office worker had been experiencing tingling in her index and middle fingers and thumb of her right hand. Recently, her wrist and hand had become weak. Her physician ordered a nerve conduction test to evaluate her for carpal tunnel syndrome. Which one of the following nerves fibre has the slowest conduction velocity?
   a. Aα fibres
   b. Aβ fibres
   c. Aγ fibers
   d. C fiber

2. A 40-year-old man is suffering from hypertension, buffalo hump and hyperpigmentation of skin, including oral mucosa. He is diagnosed with Cushing syndrome due to pituitary cause. Which of the following is responsible for the hyperpigmentation seen in this patient?
   a. TSH
   b. FSH
   c. ACTH
   d. MSH

3. A 30-year-old gentleman is diagnosed with elevated blood cholesterol levels. A defect in a process that involves the protein 'clathrin' is being suspected. Which of the following process will be most likely affected by this defect?
   a. Receptor mediated endocytosis
   b. ExocytosIs
   c. Cell to cell adhesion
   d. Plasma membrane

4. A 56-year-old woman presents with abnormal movements of the limbs. A lesion of globus pallidus is suspected Which of the following did she be likely present with?
   a. Chorea
   b. Athetosis
   c. Hemiballismus
   d. Parkinsoinism

5. A 32 years old lady undergoes thyroidectomy due to suspected malignancy. 4 weeks after the surgery she develops a spasm facial muscles on tapping over the facial nerve in front of the tragus Which of the following is the reason behind her muscle hyperexcitability?
   a. Increase in calcium
   b. Prevent K+ release
   c. Prevent Na+ and K+release
   d. Increase in permeability of Na + ions

6. A couple is undergoing evaluation for their inability to conceive. In order to rule out male factor infertility, the consultant orders a semen analysis for the husband Which of the following best estimates the normal sperm count in an adult?
   a. 20-40 million mL,
   b. 40-60 million/mL
   c. 60-80 million/mL
   d. 90-120 million//mL

7. **While exercising, 42-year-old woman developed sudden onset of tingling in her right leg and an inability to control movement in that limb. A neurologic exam showed a hyperactive knee jerk reflex and a positive Babinski sign. Which of the following is not true regarding her condition?**
   a. Reflexes can be modified by impulses from various parts of the CNS
   b. Reflexes may involve simultaneous contraction of some muscles and relaxation others of
   c. Reflexes are chronically suppressed after spinal cord transection
   d. Reflexes often occur without conscious perception

8. **A patient comes to you for his annual health checkup. He lost his vision due to an accident he met years ago. He now experiences the world through touch. Which of the following Brodmann's areas processes this tactile stimulation?**
   a. 3.1,2
   b. 4,6
   c. 44,45
   d. 41,42

9. **A 35 years old man presents with hypertension, coarse facial features, frontal bossing, large hands and feet, mandibular enlargement and a large fleshy nose. His age-matched serum IGF-I levels are elevated. What is the most likely cause of his condition?**
   a. Excess of GH
   b. Deficiency of GH
   c. Excess of somatostatin
   d. Deficiency of somatostatin

10. **What would the diagnosis be if a patient had the following test results? Weber test showed that sound from a vibrating tuning fork was louder than normal; Schwabach test showed that bone conduction was better than normal; and Rinne test showed that air conduction did not outlast bone conduction.**
    a. Sensorial deafness in both ears
    b. Conduction deafness in both ears
    c. Normal hearing
    d. Both sensorial and conduction deafness

II. **Describe and discuss the functions of cerebellum. Add a note on signs of cerebellar dysfunctions.** [10]

III. **Reasoning Questions (Why):** [5X3=15]

a. Lactation is natural contraceptive
b. Botox injections are used to smooth wrinkles on face
c. Adrenaline is lifesaving drug but not noradrenaline
d. Fovea centralis has maximum visual acuity
e. Teeth and jaw pain are possible symptoms of a heart attack

IV. **Write short notes (Applied questions) on:** [4X5=20]

a. Graves' disease
b. Indicators of ovulation
c. Pathophysiology of diabetes mellitus
d. Paradoxical sleep

V. **Explain briefly:** [3X5=15]

a. Strength duration curve
b. Aphasia and its types
c. Spermatogenesis and its control

VI. **Write short notes on:** [4X5=20]

a. Intercellular communications
b. Excitation contraction coupling in a skeletal muscle
c. Functions of middle ear
d. Rights and responsibilities of patient

SRI GURU RAM DAS UNIVERSITY OF HEALTH SCIENCES, SRI AMRITSAR

Maximum Marks: 100 | **MBBS 1st Professional Examination** | Time: 3 Hours

(Session Oct/Nov 2025)

Subject- Physiology (New Scheme)

Paper-B

Note:
1. Attempt all questions. Illustrate your answer with suitable diagrams where applicable.
2. Question No. I (Multiple Choice Questions (1-10)) is to be attempted on OMR Sheet in first 15 minutes of the start of exam.
3. Question No. II-VI are to be attempted on the main answer book. No supplementary sheet shall be provided.
4. Students must write QP code in the space provided on OMR sheet as well as on the title page of the main answer book.

QP Code: MBN104A

Multiple Choice Questions (MCQs): [10X2=20]

I.

1. A patient who got into an accident is brought to the casualty and is bleeding from his right leg. His blood pressure is 90/60 mm Hg. Which of the following plays the most important role in sodium and water retention in this patient?
a. Renin-angiotensin system
b. ADH
c. Aldosterone
d. ANP

2. A patient has a dead space of 150 mL, functional residual capacity of 3L tidal volume of 650 mL, expiratory reserve volume of 1.5 L, a total lung capacity of 8L, respiratory rate of 15 breaths/min. What is the rate of alveolar ventilation?
a. 5 L/min
b. 7.5 L/min
c. 6.0 L/min
d. 9.0 L/min

3. A patient was receiving a red cell transfusion following hip arthroplasty. Midway through the transfusion, she developed signs and symptoms of shock. What type of shock she developed?
a. Obstructive shock
b. Hypovolemic shock
c. Distributive shock
d. Cardiogenic shock

4. A 45-year-old male met with a road traffic accident and suffered a head injury. On examination, he seems drowsy and his blood pressure is high. Which reflex is responsible for elevated blood pressure in this case.
a. Bezold-Jarisch reflex
b. Bainbridge reflex
c. Cushing reflex
d. J reflex

5. During exercise, a man consumes 1.8 L of oxygen per minute. His arterial O 2 content is 190 mL/L, and the O 2 content of his mixed venous blood is 134 mL/L. His cardiac output is approximately.
a. 3.2 L/min.
b. 16 L/min.
c. 32 L/min.
d. 54 L/min

6. A 40-year-old woman comes to her primary care physician complaining of severe, episodic abdominal pain that is particularly intense after she ingests a fatty meal. An imaging procedure reveals that her gallbladder is acutely dilated, and a diagnosis of cholelithiasis is made. A gallstone lodged in which location will also increase her risk of pancreatitis?
a. Left hepatic duct
b. Cystic duct
c. Common bile duct
d. Sphincter of Oddi

7. **A 20 years old college student comes to the student health center in April complaining of runny nose and congestion, itchy eyes, and wheezing. She reports that similar symptoms have occurred at the same time each year, and that she obtains some relief from over the counter antihistamine drugs, although they make her too drowsy to study. Her symptoms can most likely be attributed to inappropriate synthesis of which of the following antibodies specific for tree pollen?**
   a. IgA
   b. IgD
   c. IgM
   d. IgG

8. **A 34 years old man has an ejection fraction of 0.25 and an End Systolic volume of 150 ml. What is his end diastolic volume?**
   a. 50 ml
   b. 125 ml
   c. 100 ml
   d. 200 ml

9. **A 22 years old female visit general physician with chief complains of generalized fatigue, weakness n palpitation "Lab finding revealed Hb - 7.5 gm%, RBC count – 4 millions/cumm, MCV - 62 fl, MCH - 23 pg, MCHC - 25 %, S. Bilirubin- 0.4 mg%. What is the diagnosis?**
   a. Megaloblastic anaemia
   b. Aplastic anaemia
   c. Iron deficiency anemia
   d. Sickle cell anaemia

10. **A 24 years old African American man comes to the emergency room 3 hours after the onset of severe back and chest pain which started when he was climbing up a mountain. He had an episoce of same symptoms five years ago. His values are Hb: 1 1g/dL TLC: 12,000mm', Reticulocyte count: 25%, What is the diagnosis of this patient?**
   a. Acute blood loss
   b. Sickle cell anemia
   c. Anemia of chronic disease
   d. End stage kidney disease

II. **Define Cardiac Cycle. Describe the events occurring during cardiac cycle with the help of diagram.** [2+8=10]

III. **Reasoning Questions (Why):** [5X3=15]

a. Low dose of aspirin is useful for preventing Myocardial infarction
b. Oedema in nephrotic syndrome
c. Dilated heart fails faster
d. Gastric atrophy may cause Pernicious anaemia
e. Cyanosis is not a reliable sign of hypoxia.

IV. **Write short notes (Applied questions) on:** [4X5=20]

a. ECG changes in acute Myocardial Infarction
b. Peptic ulcer and its management
c. Sickle cell anaemia
d. Decompression sickness

V. **Explain briefly:** [3X5=15]

a. Movements of large intestine
b. Glomerular filtration rate
c. Cardiovascular and respiratory adjustments during exercise

VI. **Write short notes on:** [4X5=20]

a. Renal handling of glucose
b. Oxygen-haemoglobin dissociation curve
c. Hazards of mismatched blood transfusion
d. Trust and vulnerability in doctor patient relationship.