Contents

Section 1: General Physiology

Section 2: Hematology

Section 3: Cardiovascular System

Competency Table

Number	*Competency: The student should be able to*	*Core(Y/N)*	*Chapter Number*	*Page Number*
PY1.1	Describe the structure and functions of a mammalian cell	Y	4	15
PY1.2	Describe and discuss the principles of homeostasis	Y	3	11
PY1.3	Describe intercellular communication	Y	61	554
PY1.4	Describe apoptosis – programmed cell death	Y	4	29
PY1.5	Describe and discuss transport mechanisms across cell membranes	Y	5	34
PY1.6	Describe the fluid compartments of the body, its ionic composition and measurements	Y	2 20	7 183
PY1.7	Describe the concept of pH and Buffer systems in the body	Y	1	1
PY1.8	Describe and discuss the molecular basis of resting membrane potential and action potential in excitable tissue	Y	6	48
PY2.1	Describe the composition and functions of blood components	Y	11	99
PY2.2	Discuss the origin, forms, variations, and functions of plasma proteins	Y	12	102
PY2.3	Describe and discuss the synthesis and functions of hemoglobin and explain its breakdown. Describe variants of hemoglobin	Y	13	111
PY2.4	Describe RBC formation (erythropoiesis and its regulation) and its functions	Y	13	116
PY2.5	Describe different types of anemias and jaundice	Y	13 48	122 446
PY2.6	Describe WBC formation (granulopoiesis) and its regulation	Y	14	138
PY2.7	Describe the formation of platelets, functions, and variations	Y	17	159
PY2.8	Describe the physiological basis of hemostasis, and anticoagulants. Describe bleeding and clotting disorders (Hemophilia, purpura)	Y	18	164
PY2.9	Describe different blood groups and discuss the clinical importance of blood grouping, blood banking and transfusion	Y	21	186
PY2.10	Define and classify different types of immunity. Describe the development of immunity and its regulation	Y	16	146
PY2.12	Describe test for ESR, osmotic fragility, hematocrit. Note the findings and interpret the test results, etc.	Y	13	107 108 110
PY3.1	Describe the structure and functions of a neuron and neuroglia; Discuss nerve growth factor and other growth factors/cytokines	Y	6	44
PY3.2	Describe the types, functions and properties of nerve fibers	Y	6	44
PY3.3	Describe the degeneration and regeneration in peripheral nerves	Y	6	58
PY3.4	Describe the structure of neuro-muscular junction and transmission of impulses	Y	8	79
PY3.5	Discuss the action of neuro-muscular blocking agents	Y	8	81
PY3.6	Describe the pathophysiology of myasthenia gravis	Y	8	82
PY3.7	Describe the different types of muscle fibers and their structure	Y	7	65
PY3.8	Describe action potential and its properties in different muscle types (skeletal and smooth)	Y	7 10	68 91
PY3.9	Describe the molecular basis of muscle contraction in skeletal and in smooth muscles	Y	7 10	69 92
PY3.10	Describe the mode of muscle contraction (isometric and isotonic)	Y	7	71
PY3.11	Explain energy source and muscle metabolism	Y	7	73
PY3.12	Explain the gradation of muscular activity	Y	7	75

Number	Competency: The student should be able to	Core(Y/N)	Chapter Number	Page Number
PY3.13	Describe muscular dystrophy: myopathies	Y	7	75
PY3.17	Describe strength-duration curve	Y	6	55
PY4.1	Describe the structure and functions of digestive system	Y	44	405
PY4.2	Describe the composition, mechanism of secretion, functions, and regulation of saliva, gastric, pancreatic, intestinal juices and bile secretion	Y	45 46 47 48 49 50	416 425 438 444 452 455
PY4.3	Describe GIT movements, regulation and functions. Describe defecation reflex. Explain role of dietary fiber	Y	50 51	456 459
PY4.4	Describe the physiology of digestion and absorption of nutrients	Y	52	469
PY4.5	Describe the source of GIT hormones, their regulation and functions	Y	53	477
PY4.6	Describe the Gut-Brain axis	Y	44	409
PY4.7	Describe and discuss the structure and functions of liver and gallbladder	Y	48	443, 447
PY4.8	Describe and discuss gastric function tests, pancreatic exocrine function tests and liver function tests	Y	47 48	441 448
PY4.9	Discuss the physiology aspects of: peptic ulcer, gastroesophageal reflux disease, vomiting, diarrhea, constipation, adynamic ileus, Hirschsprung's disease	Y	46 51	432 463, 466
PY5.1	Describe the functional anatomy of heart including chambers, sounds; and pacemaker tissue and conducting system	Y	22	202
PY5.2	Describe the properties of cardiac muscle including its morphology, electrical, mechanical and metabolic functions	Y	9 22	85 208
PY5.3	Discuss the events occurring during the cardiac cycle	Y	24	224
PY5.4	Describe generation, conduction of cardiac impulse	Y	22	205
PY5.6	Describe abnormal ECG, arrhythmias, heart block and myocardial infarction	Y	23	212 217
PY5.7	Describe and discuss hemodynamics of circulatory system	Y	25	234
PY5.8	Describe and discuss local and systemic cardiovascular regulatory mechanisms	Y	26 28	243 261
PY5.9	Describe the factors affecting heart rate, regulation of cardiac output and blood pressure	Y	26 27 28	243 253 263
PY5.10	Describe and discuss regional circulation including microcirculation, lymphatic circulation, coronary, cerebral, capillary, skin, fetal, pulmonary and splanchnic circulation	Y	19 32 36	179 290 343
PY5.11	Describe the patho-physiology of shock, syncope and heart failure	Y	28	272
PY5.12	Record blood pressure and pulse at rest and in different grades of exercise and postures in a volunteer or simulated environment	Y	29	281
PY5.16	Record arterial pulse tracing using finger plethysmography in a volunteer or simulated environment	N	29	281
PY6.1	Describe the functional anatomy of respiratory tract	Y	33	315
PY6.2	Describe the mechanics of normal respiration, pressure changes during ventilation, lung volume and capacities, alveolar surface tension, compliance, airway resistance, ventilation, V/P ratio, diffusion capacity of lungs	Y	34 35 36 37	322 331 348 351
PY6.3	Describe and discuss the transport of respiratory gases: Oxygen and Carbon dioxide	Y	38	357
PY6.4	Describe and discuss the physiology of high altitude and deep sea diving	Y	40	386
PY6.5	Describe and discuss the principles of artificial respiration, oxygen therapy, acclimatization and decompression sickness	Y	39 40 42	380 389 398
PY6.6	Describe and discuss the pathophysiology of dyspnea, hypoxia, cyanosis asphyxia; drowning, periodic breathing	Y	39	378
PY6.7	Describe and discuss lung function tests and their clinical significance	Y	43	401
PY7.1	Describe structure and function of kidney	Y	54	483

Number	Competency: The student should be able to	Core(Y/N)	Chapter Number	Page Number
PY7.2	Describe the structure and functions of juxtaglomerular apparatus and role of renin-angiotensin system	Y	54	487
PY7.3	Describe the mechanism of urine formation involving processes of filtration, tubular reabsorption and secretion; concentration and diluting mechanism	Y	55	494
PY7.4	Describe and discuss the significance and implication of renal clearance	Y	55	496 509
PY7.5	Describe the renal regulation of fluid and electrolytes and acid-base balance	Y	55	498
PY7.6	Describe the innervations of urinary bladder, physiology of micturition and its abnormalities	Y	55 56	509 519
PY7.7	Describe artificial kidney, dialysis and renal transplantation	Y	55	514
PY7.8	Describe and discuss renal function tests	Y	57	524
PY7.9	Describe cystometry and discuss the normal cystometrogram	Y	56	521
PY8.1	Describe the physiology of bone and calcium metabolism	Y	66	608
PY8.2	Describe the synthesis, secretion, transport, physiological actions, regulation and effect of altered (hypo and hyper) secretion of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas and hypothalamus	Y	62 63 65 66 67 68	565, 579 582 591 610 620 640
PY8.3	Describe the physiology of thymus and pineal gland	Y	64 69	587 654
PY8.4	Describe function tests: Thyroid gland; adrenal cortex, adrenal medulla and pancreas	Y	65 67 68	599 620 640
PY8.5	Describe the metabolic and endocrine consequences of obesity and metabolic syndrome, stress response. Outline the psychiatry component pertaining to metabolic syndrome	Y	68	648
PY8.6	Describe and differentiate the mechanism of action of steroid, protein and amine hormones	Y	61	552 555
PY9.1	Describe and discuss sex determination; sex differentiation and their abnormiities and outline psychiatry and practical implication of sex determination	Y	71	665
PY9.2	Describe and discuss puberty: onset, progression, stages; early and delayed puberty and outline adolescent clinical and psychological association	Y	71	670
PY9.3	Describe male reproductive system: functions of testis and control of spermatogenesis and factors modifying it and outline its association with psychiatric illness	Y	72	673
PY9.4	Describe female reproductive system: (a) functions of ovary and its control; (b) menstrual cycle—hormonal, uterine and ovarian changes	Y	73	684
PY9.5	Describe and discuss the physiological effects of sex hormones	Y	72 73	678 690
PY9.6	Enumerate the contraceptive methods for male and female. Discuss their advantages and disadvantages	Y	77	714
PY9.7	Describe and discuss the effects of removal of gonads on physiological functions	Y	72	680
PY9.8	Describe and discuss the physiology of pregnancy, parturition and lactation and outline the psychology and psychiatry—disorders associated with it	Y	74 76	701, 706 711
PY9.9	Interpret a normal semen analysis report including (a) sperm count, (b) sperm morphology, and (c) sperm motility, as per WHO guidelines and discuss the results	Y	72	678
PY9.10	Discuss the physiological basis of various pregnancy tests	Y	74	705
PY9.11	Discuss the hormonal changes and their effects during perimenopause and menopause	Y	73	696
PY9.12	Discuss the common causes of infertility in a couple and role of IVF in managing a case of infertility	Y	77	717
PY10.1	Describe and discuss the organization of nervous system	Y	78	721
PY10.2	Describe and discuss the functions and properties of synapse, reflex, receptors	Y	79 80 81	731 747 761

Number	Competency: The student should be able to	Core(Y/N)	Chapter Number	Page Number
PY10.3	Describe and discuss somatic sensations and sensory tracts	Y	80 81 82	747 761 770
PY10.4	Describe and discuss motor tracts, mechanism of maintenance of tone, control of body movements, posture and equilibrium and vestibular apparatus	Y	84 89 90	798 838 845
PY10.5	Describe and discuss structure and functions of reticular activating system, autonomic nervous system (ANS)	Y	88 94	835 863
PY10.6	Describe and discuss spinal cord, its functions, lesion and sensory disturbances	Y	85	810
PY10.7	Describe and discuss functions of cerebral cortex, basal ganglia, thalamus, hypothalamus, cerebellum and limbic system and their abnormalities	Y	83 86 87 91 92 93	794 815 825 849 855 860
PY10.8	Describe and discuss behavioral and EEG characteristics during sleep and mechanism responsible for its production	Y	95	873
PY10.9	Describe and discuss the physiological basis of memory, learning and speech	Y	96	882
PY10.13	Describe and discuss perception of smell and taste sensation	Y	100 101	965 969
PY10.14	Describe and discuss patho-physiology of altered smell and taste sensation	Y	100 101	965, 968 973
PY10.15	Describe and discuss functional anatomy of ear and auditory pathways and physiology of hearing	Y	99	943
PY10.16	Describe and discuss pathophysiology of deafness. Describe hearing tests	Y	99	957
PY10.17	Describe and discuss functional anatomy of eye, physiology of image formation, physiology of vision including color vision, refractive errors, color blindness, physiology of pupil and light reflex	Y	98	901
PY10.18	Describe and discuss the physiological basis of lesion in visual pathway	Y	98	930
PY10.19	Describe and discuss auditory and visual evoke potentials	Y	99	960
PY11.1	Describe and discuss mechanism of temperature regulation	Y	59	534
PY11.2	Describe and discuss adaptation to altered temperature (heat and cold)	Y	59	540
PY11.3	Describe and discuss mechanism of fever, cold injuries and heat stroke	Y	59	540
PY11.4	Describe and discuss cardio-respiratory and metabolic adjustments during exercise; physical training effects	Y	30 41 102	285 395 977
PY11.5	Describe and discuss physiological consequences of sedentary lifestyle	Y	102	977
PY11.6	Describe physiology of infancy	N	102	977
PY11.7	Describe and discuss physiology of aging; free radicals and antioxidants	N	102	977
PY11.8	Discuss and compare cardio-respiratory changes in exercise (isometric and isotonic) with that in the resting state and under different environmental conditions (heat and cold)	Y	102	977
PY11.11	Discuss the concept, criteria for diagnosis of brain death and its implications	Y	102	977
PY11.12	Discuss the physiological effects of meditation	N	95	878
PY11.14	Demonstrate basic life support in a simulated environment	Y	42	399