ANATOMY AND PHYSIOLOGY

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B-3.0
C-2.0
D-1.0
I- Incomplete

A	B	C	D	I

I. Applying Principles of Anatomy and Physiology

1. Science as Inquiry

1.1 Explain science inquiry
1.2 Demonstrate abilities necessary to conduct scientific inquiry

2. Physical Science

2.1 Describe the structure of atoms
2.2 Identify structure and properties of matter
2.3 Examine chemical reactions
2.4 Explain motions and forces
2.5 Describe conservation of energy and increase in disorder
2.6 Illustrate interaction of energy and matter

3. Life Science

3.1 Analyze the cell
3.2 Examine the molecular basis of heredity
3.3 Describe biological evolution
3.4 Explain the interdependence of organisms
3.5 Describe matter, energy, and organization in living systems
3.6 Differentiate the behavior of organisms

II. Human Structure and Function

1. Introduction of structure, function and homeostasis

1.1 Analyze the relationship between structure and function
1.2 Describe the six levels of structural organization of the human body
1.3 Define metabolism and differentiate between anabolic and catabolic processes
1.4 Identify the planes commonly used to divide the body into portions
1.5 Examine the body cavities and their associated organs
1.6 Identify the location of the abdominal quadrants and their organs
1.7 Describe homeostasis and stress; compare their relationship
1.8 Explain the components of a feedback mechanism
1.9 Contrast extracellular and intercellular fluids in terms of location and composition

2. Chemistry

2.1 Describe the states of matter
2.2 Identify the basic components of the atom

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2. Chemistry

2.3 Identify and explain an element
2.4 Differentiate between a compound and a molecule
2.5 Describe an ion, cation, and anion
2.6 Explain the characteristics of ionic, covalent and hydrogen bonds
2.7 Discuss pH and distinguish between “neutral” and “normal” pH of the blood
2.8 Given the pH of a solution, categorize it as acidic, basic, or neutral
2.9 Describe environmental factors that influence pH of blood and pH of other body fluids
2.10 Given any of the properties of water, explain each property is utilized by the body
2.11 Distinguish the characteristic of inorganic and organic compounds
2.12 Identify and discuss the structures and functions of carbohydrates, proteins, lipids and nucleic acids
2.13 Distinguish the characteristics of saturated fats, monounsaturated fats, and polyunsaturated fats
2.14 Describe the ATP ADP + P + Energy conversion that occurs when the body needs energy and when the body stores energy

3. Cell Biology

3.1 Explain the four principle parts of a generalized animal cell and their functions
3.2 Describe cell membrane structure and function
3.3 Compare selectively permeable membranes and discuss factors which influence permeability
3.4 Examine each transport process, classify as active or passive
3.5 Analyze the osmotic effects that occur when a cell is placed in an isotonic, hypotonic, or hypertonic solution
3.6 Discuss the function of the structures within the cell nucleus
3.7 Identify the major functions and characteristics of organelles or cell membrane modifications
3.8 Explain the reasons why cell division occurs and differentiate among mitosis, cytokinesis and meiosis
3.9 Evaluate the structure of DNA
3.10 Examine the process of protein synthesis

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4. Histology and the Integumentary System

4.1 Differentiate the general functions of each of the principle types of tissue
4.2 Compare and contrast exocrine and endocrine glands
4.3 Differentiate among the types of membranes
4.4 Identify and describe parts that make up the integumentary system and explain their overall function
4.5 Characterize the major layers of the skin
4.6 Explain the function of sudoriferous and sebaceous glands
4.7 Examine the following disease or disorder: acne, athlete's foot, burns, cancer, decubitis ulcer

5. Skeletal System

5.1 Examine the general functions of the skeletal system
5.2 Explain ossification and discuss the roles of the osteoblasts, osteocytes, and osteoclasts in bone growth
5.3 Describe the structure and functional features of a typical long bone
5.4 Contrast the structural differences between compact and spongy bone
5.5 Categorize the four classes of bone and examine the characteristics of each
5.6 Explain bone markings
5.7 Differentiate between the terms "suture" and "fontanel"
5.8 Categorize the major groups of bones that belong to the axial skeleton and to the appendicular skeleton
5.9 Identify the locations of the skull bones
5.10 Examine the general number, location and function of each of the five groups of vertebrae
5.11 Describe the structural and functional classifications of articulations
5.12 Analyze a ligament and its role in a synovial joint
5.13 Evaluate the influence of aging, exercise and lifestyle on bone remodeling
5.14 Examine the following diseases or disorders: arthritis, bursitis, fractures, herniated disc, kyphosis, lordosis, osteoporosis, rickets, scoliosis and sprain

6. Muscular System

6.1 Examine the general function of the muscular system
6.2 Explain the four characteristics of muscle tissue
6.3 Compare the general location, microscopic appearance, control, and functions of the three specific kinds of muscle tissue
6.4 Distinguish the proteins that compose the thick and thin myofilaments
6.5 Analyze the sliding-filament theory of muscle contraction
6.6 Describe the structures in muscle contraction and identify their role in the process

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6. Muscular System cont.

6.7 Differentiate between the terms "origin" and "insertion" as applied to muscles
6.8 Analyze how levers function and identify first;- second;- and third-class levers and demonstrate an example of each
6.9 Explain the role of agonists, antagonists, synergists and fixators
6.10 Discuss and demonstrate angular movements
6.11 Describe the location and function of the following muscles: biceps, triceps brachii, sternocleidomastoid, trapezius, deltoid, rectus abdominis, internal & external oblique, pectoralis major, latissimus dorsi, diaphragm, gastrocnemius, hamstring, quadriceps, and gluteus maximus
6.12 Locate three commonly chosen sites for intramuscular injections
6.13 Examine the following diseases or disorders: abnormal contractions, contractures, fibromyalgia muscular dystrophy, myasthenia gravis, shin splints, strains

7. Nervous System

7.1 Discuss the three broad functions of the nervous system
7.2 Describe the general organization of the nervous system
7.3 Explain the structure and function of neurons and Schwann cells
7.4 Construct the major events when nerve impulse is initiated and transmitted in a neuron
7.5 Differentiate between white and gray matter, including age-related differences/changes
7.6 Examine the structures responsible for the maintenance and protection of the central nervous system
7.7 Compare the role of each of the components of a reflex arc
7.8 Locate the targets and organs of the phrenic and sciatic nerves
7.9 Identify the four principle parts of the brain
7.10 Describe CSF and identify the areas where it is typically located
7.11 Locate the three divisions of the brain stem and list their general functions
7.12 Identify the two divisions of the diencephalons and list their general functions
7.13 Identify the four lobes of the cerebrum and list their general functions
7.14 Explain the major functions of the cerebellum
7.15 Examine the following diseases and disorders: addictions, Alzheimer's, cephalgia, cerebral palsy, closed head injury, depression, meningitis, multiple sclerosis, Parkinson's, peripheral neuropathy, seizure disorders, spina bifida

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8. Sensations and Special Senses

8.1 Distinguish between somatic senses and special senses
8.2 Describe the function of receptors
8.3 Discuss the areas of the tongue associated with the four major tastes
8.4 Examine the principal anatomical structures and basic functions of the eye
8.5 Describe the internal structures and basic function of the eyeball
8.6 Differentiate between the structure and function of rod and cone photoreceptor cells
8.7 Examine the principal anatomical structures and basic functions of the ear
8.8 Contrast static and dynamic equilibrium
8.9 Evaluate various applicable assistive devices
8.10 Examine the following diseases and disorders: ambiopia, anosmia, cataracts, conjunctivitis, deafness, glaucoma, macular degeneration, middle ear infection, strabismus, tinnitus, vertigo

9. Endocrine System

9.1 Examine the general functions of the endocrine system
9.2 Identify and explain hormones and describe their functions in the body
9.3 Identify and locate the major endocrine glands
9.4 Discuss the major hormones of the endocrine glands and their functions
9.5 Describe the general adaptation syndrome, and compare homeostatic response and stress response
9.6 Examine the following diseases or disorders: acromegaly, Addison's disease, aldosteronism, cretinism, Cushing's syndrome, diabetes mellitus, dwarfism, gigantism, goiter, Graves' disease, hyperthyroidism, myxedema, seasonal affective disorder

10. Blood

10.1 Examine the general formed elements of the blood and their development and general functions
10.2 Describe the structure of erythrocytes including hemoglobin
10.3 Explain leukocytes and describe their two major groups
10.4 Differentiate between plasma and serum
10.5 Examine hemostasis and identify its three stages
10.6 Contrast a thrombus and an embolus
10.7 Given any of the four blood groups in the ABO system, identify antigens found on the erythrocytes and the antibodies found in the plasma of that blood group
10.8 Compare and contrast the Rh system to the ABO blood system
10.9 Examine the following diseases and disorders: anemias, hemolytic disease of newborns, hemophilia, LDL/HDL imbalances, leukemia, mononucleosis, polycythemia

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11. Lymphatic System

11.1 Examine the components of the lymphatic system
11.2 Describe how lymph is moved throughout the body
11.3 Differentiate between antigens and antibodies
11.4 Describe the general roles of the different types of T cells in cellular immunity
11.5 Explain the role of the B cells in humoral immunity
11.6 Distinguish between active and passive immunity, and natural versus artificial acquisition of immunity
11.7 Examine the following diseases and disorders: AIDS, allergies, anaphylaxis, autoimmune, lymphoma, measles, mumps, rubella, tetanus, tissue rejection

12. Cardiovascular System

12.1 Explain the general functions of the cardiovascular system
12.2 Describe the layers of the heart
12.3 Identify the great blood vessels of the heart
12.4 Identify the valves of the heart
12.5 Illustrate the blood flow through the heart
12.6 Identify the components of the conduction system of the heart and trace its pathway
12.7 Explain systole and diastole and identify the position of the heart valves during each phase of the cycle
12.8 Discuss stroke volume and heart rate
12.9 Identify the chambers of the heart and contrast work performed by each side
12.10 Explain cardiac output and identify those factors that determine it
12.11 Compare and contrast the structures and function of arteries, capillaries and veins
12.12 Explain pulse and identify the general location of arteries at which pulse may be felt
12.13 Explain blood pressure and describe how a sphygmomanometer is used to measure it
12.14 Contrast pulmonary and systemic circulation routes
12.15 Identify the general risk factors associated with cardiovascular disease
12.16 Examine the following diseases or disorders: aneurysm, angina pectoris, arrhythmias, atherosclerosis, CAD, congestive heart failure, CVA/stroke, hyperlipidemia, murmurs, myocardial infarction, shock (various forms), valve disorders

13. Respiratory System

13.1 Examine the general functions of the respiratory system
13.2 Locate the organs of the respiratory system and describe the order in which air will pass through them from the exterior
13.3 Identify the three regions of the pharynx

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13. Respiratory System cont.

13.4 Locate and explain the anatomical features of the larynx and associated structures
13.5 Identify the coverings of the lungs and anatomical features of the lung
13.6 Describe the site at which gas exchange occurs in the lung
13.7 Discuss the volumes and capacities of air exchange during ventilation
13.8 Differentiate between ventilation and external and internal respiration
13.9 Describe the effects of carbon dioxide on respiration
13.10 Identify various assistive devices used to assist respiration
13.11 Examine the following diseases or disorders: asthma (bronchial), bronchiogenic carcinoma, coryza, cystic fibrosis, emphysema, influenza, pneumonia, respiratory distress syndrome, rhinitis, SIDS, tuberculosis

14. Digestive System

14.1 Examine the general functions of the digestive system
14.2 Contrast chemical and mechanical digestion
14.3 Differentiate between alimentary canal structures and accessory structures of digestion
14.4 Locate the salivary gland
14.5 Explain the functions of saliva and of salivary amylase in digestion
14.6 Identify the parts of a typical tooth
14.7 Explain deglutition, mastication, maceration, segmentation and haustral churning
14.8 Identify the anatomical features of the esophagus and stomach
14.9 Discuss the four basic components of gastric juice
14.10 Locate and describe the digestive function of the pancreas
14.11 Describe the function of bile and the role of the gallbladder in digestion
14.12 Locate the three sections of small intestine and discuss associated intestinal enzymes
14.13 Explain two major mechanical movements of the small intestine
14.14 Locate and explain the structures and sections of the large intestine
14.15 Describe environmental factors affecting digestion
14.16 Examine the following diseases and disorders: anorexia nervosa, appendicitis, bulimia, cirrhosis, colorectal cancer, dental caries, gallstones, hepatitis, hernia, obesity, pancreatic cancer, ulcer

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15. Urinary System

15.1 Examine the general functions of the urinary system
15.2 Locate and identify the four major structures of the urinary system
15.3 Identify the anatomy of the kidney
15.4 Identify the microscopic structures of the nephron
15.5 Identify and describe the three basic physiological processes involved in urine formation
15.6 Discuss the physical characteristics and normal chemical constituents of urine
15.7 Compare the balance and measurement of fluid intake and output, including micturition, sweat, feces, exhaled vapor
15.8 Describe fluid and electrolyte balance
15.9 Examine the following diseases and disorders: cystitis, diabetes insipidus, glomerulonephritis, incontinence, kidney stones, nephritic syndrome, renal failure, renal ptosis, urinary tract infections

16. Reproductive System

16.1 Examine the general function of the reproductive system
16.2 Describe the anatomy of the male genitalia
16.3 Explain the function of the testes
16.4 Discuss the function of testosterone in the male
16.5 Describe the anatomy of the female genitalia
16.6 Explain the functions of the ovaries
16.7 Identify the structure and function of the uterine tubes, including fimbrae and infundibulum
16.8 Describe the structure and function of the uterus including the cervix, fundus and its layers
16.9 Discuss the menstrual cycle
16.10 Describe the physiological effects of estrogen, progesterone and relaxin
16.11 Contrast the general outcomes of mitosis versus meiosis
16.12 Contrast the general outcomes of spermatogenesis versus oogenesis
16.13 Distinguish the sequence of events that occur during human development
16.14 Explain the principal events associated with the stages of labor
16.15 Analyze biological inheritance
16.16 Examine the inheritance of traits including predisposition to disease
16.17 Describe genetic testing, such as amniocentesis and corionic villus sampling
16.18 Examine the following diseases and disorders: amenorrhea, cancers, cryptorchidism, endometriosis, impotence, infertility, premenstrual syndrome, STDs, toxic shock syndrome, yeast infections