BIOL-8 Practice Test 04

Modules 12-15: Organ Systems (Muscular, Nervous, Endocrine, Cardiovascular)

Instructions: This practice test covers material from Modules 12-15. Answer all questions to the best of your ability.

Part A: Multiple Choice (32 questions)

Choose the best answer for each question.

Module 12: Muscular System

1. The functional unit of muscle contraction is the: A) Myofibril B) Sarcomere C) Sarcolemma D) Fascicle

2. Which protein differs between thick and thin filaments? A) Actin is thick; Myosin is thin B) Myosin is thick; Actin is thin C) Troponin is thick; Tropomyosin is thin D) Both are the same thickness

3. Calcium ions are stored in the: A) Sarcoplasmic reticulum B) Mitochondria C) Nucleus D) T-tubules

4. The molecule that directly provides energy for muscle contraction is: A) Glucose B) Creatine phosphate C) ATP D) Calcium

5. A motor unit consists of: A) One neuron and all the muscle fibers it stimulates B) One muscle fiber and all the neurons that stimulate it C) An entire muscle group D) The brain and spinal cord

6. Which type of muscle contraction involves tension without changing length? A) Isotonic B) Isometric C) Tetanic D) Concentric

7. Oxygen debt occurs when: A) Muscles use aerobic respiration B) Muscles rely on lactic acid fermentation C) Creatine phosphate is regenerated D) Glucose is plentiful

8. The sliding filament theory explains how: A) Bones move B) Actins and myosins slide past each other to shorten the sarcomere C) ATP is produced D) Nerves signal muscles

Module 13: Nervous System

9. The central nervous system (CNS) consists of: A) Brain and spinal cord B) Brain and cranial nerves C) Spinal cord and spinal nerves D) Sensory and motor neurons

10. Which part of the neuron receives incoming signals? A) Axon B) Dendrite C) Cell body D) Myelin sheath

11. The "fight or flight" response is controlled by the: A) Somatic nervous system B) Parasympathetic division C) Sympathetic division D) Central nervous system

12. Myelin sheaths in the PNS are formed by: A) Oligodendrocytes B) Schwann cells C) Astrocytes D) Microglia

13. The gap between two neurons is called the: A) Node of Ranvier B) Synapse C) Axon terminal D) Ganglion

14. Which part of the brain controls balance and coordination? A) Cerebrum B) Cerebellum C) Brainstem D) Hypothalamus

15. A reflex arc typically involves: A) The brain only B) Sensory neuron, interneuron (spinal cord), motor neuron C) Motor neuron only D) Conscious thought

16. Action potentials are: A) Chemical signals B) All-or-none electrical signals traveling down an axon C) Graded potentials in dendrites D) Neurotransmitter releases

Module 14: Endocrine System

17. Endocrine glands differ from exocrine glands because they: A) Have ducts B) Secrete hormones directly into the blood C) Produce sweat and oil D) Only affect nearby cells

18. The "master gland" that controls many other glands is the: A) Thyroid B) Adrenal C) Pituitary D) Pancreas

19. Insulin acts to: A) Raise blood glucose levels B) Lower blood glucose levels C) Increase blood calcium D) Decrease metabolic rate

20. Which hormone is involved in the stress response (long-term)? A) Adrenaline (Epinephrine) B) Cortisol C) Melatonin D) Calcitonin

21. The thyroid gland requires which element to function? A) Calcium B) Iodine C) Iron D) Sodium

22. Type 1 diabetes is caused by: A) Insulin resistance in cells B) Destruction of insulin-producing pancreatic cells C) Consuming too much sugar D) Lack of ADH

23. Hormones that can cross the cell membrane and bind to intracellular receptors are usually: A) Steroid hormones (lipid-soluble) B) Peptide hormones (water-soluble) C) Proteins D) Enzymes

24. The posterior pituitary stores and releases: A) Growth hormone B) Oxytocin and ADH (Antidiuretic Hormone) C) TSH D) Insulin

Module 15: Cardiovascular System

25. The chambers of the heart that pump blood OUT are the: A) Atria B) Ventricles C) Valves D) Veins

26. Deoxygenated blood returns to the heart via the: A) Pulmonary artery B) Aorta C) Vena cava D) Pulmonary vein

27. The valve between the right atrium and right ventricle is the: A) Tricuspid valve B) Bicuspid (Mitral) valve C) Pulmonary semilunar valve D) Aortic semilunar valve

28. Pulmonary circulation transports blood between the heart and the: A) Body B) Lungs C) Brain D) Kidneys

29. The "pacemaker" of the heart is the: A) AV node B) SA node C) Bundle of His D) Purkinje fibers

30. Which blood vessel type allows for gas exchange? A) Arteries B) Veins C) Capillaries D) Arterioles

31. Systolic pressure represents: A) The pressure when the ventricles relax B) The pressure when the ventricles contract C) The pressure in the veins D) The heart rate

32. Which component of blood is responsible for clotting? A) Red blood cells B) White blood cells C) Plasma D) Platelets

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Part B: Fill in the Blank (10 questions)

Write the correct term in the blank.

33. The molecule ___ binds to oxygen in red blood cells. **34.** A cell that responds to a specific hormone is called a ___ cell. **35.** The gap between the axon terminal and the muscle fiber is the ___ junction. **36.** The part of the brain responsible for higher thought and memory is the ___. **37.** ___ carry blood AWAY from the heart. **38.** Only ___ hormones can pass directly through the plasma membrane. **39.** The neurotransmitter released at the neuromuscular junction is ___. **40.** A ___ feedback loop reverses a change to maintain homeostasis (e.g., body temperature). **41.** The largest artery in the body is the ___. **42.** ___ volume is the amount of blood pumped by the heart in one minute.

Part C: Short Answer (5 questions)

Answer each question in 2-4 complete sentences.

43. Describe the sliding filament theory of muscle contraction. What happens to actin and myosin?

44. Differentiate between the sympathetic and parasympathetic nervous systems. Give an example of a physiological response for each.

45. Compare Type 1 and Type 2 diabetes mellitus in terms of cause and treatment.

46. Trace the path of a drop of blood through the heart, starting at the Vena Cava and ending at the Aorta. Include chambers, valves, and lungs.

47. Explain how negative feedback regulates blood glucose levels involving Insulin and Glucagon.

End of Practice Test 04