

When you are done, you must turn in the entire exam and your answer sheet to Dr. Alexander or one of the proctors, and show them your identification, or your exam will not be graded. Keep your answer sheet and test as shielded as possible at all times. Good luck!

CORRECT ANSWERS ARE HIGHLIGHTED

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For each question, please fill in the appropriate circle on your answer sheet the answer that you think BEST answers the question. Be sure that you read the entire question first. The questions are worth 2 points each.

1. Amphibians belong to the subphylum:

- A) Urochordata. B) Mammalia. C) Craniata. D) Cephalochordata. E) Chordata

2. Which of the following is **not** one of the main features which characterize all Chordates?

- A) pharyngeal gill slits. B) notochord. C) amniotic egg. D) dorsal nerve cord. E) post-anal tail.

3. The ammocoete larvae is the larval form of a:

- A) sea squirt. B) lancelet. C) bony fish. D) lamprey. E) hagfish.

4. You are an exobiologist (sent by General Hammond) on a foreign planet, and you discover that the biota of the planet is identical to ours. You notice a fierce species that has a two-chambered heart, gills, a bony endoskeleton, and the adult is found in water. It does not have fur or feathers, nor does it have a shelled egg. You would place it which vertebrate group? A) Osteichthyes. B) Mammalia. C) Aves. D) Reptilia. E) Chondrichthyes.

5. The class Chondrichthyes is/are characterized by: A) a bony endoskeleton, operculum and swim bladder.

- B) a cartilaginous endoskeleton. C) an amniotic egg. D) feathers. E) Two of the above are correct answers.

6. The amniotic egg **first** evolved in which vertebrate group?

- A) birds. B) egg-laying mammals (monotremes). C) amphibians. D) fish. E) reptiles.

7. Which of the following vertebrate groups is/are **not** considered a tetrapod?

- A) Aves. B) Osteichthyes. C) Amphibia. D) Reptilia. E) Two of the above answers are not tetrapods.

8. Which of the following traits is a feature that is characteristic of **only** the birds? A) the only group with bony vertebrae. B) the only living group with feathers covering body. C) only living group that possesses an amniotic egg. D) the only animal group that is capable of powered flight. E) the only living group with lungs.

9. Which mammal group gives birth to live young, and also nourishes their young via a placenta?

- A) monotreme mammals. B) marsupial mammals. C) eutherian mammals.

10. The main function of epithelial tissue is: A) to cover surfaces. B) contraction. C) to transmit information from one part of the body to another. D) to support or connect other tissues. E) to increase freedom of movement.

11. Connective tissue cells are typically attached to a basement membrane that they secrete.

- A) True. B) False.

12. The microscopic chambers in bone that house mature osteocytes are called:

- A) lamellae. B) Haversian canals. C) stratum basale. D) ganglia. E) lacunae.

13. Which of the following is **not** an example of a connective tissue? A) cartilage. B) bone. C) spinal cord.

- D) blood. E) All of the above are actually examples of connective tissue.

14. Skeletal muscles are: A) smooth and involuntary. B) smooth and unbranched. C) smooth and voluntary.
D) striated and voluntary. E) striated and branched.

15. The muscle type that is nonstriated, is spindle shaped and contracts under involuntary control is _____.
A) smooth muscle. B) skeletal muscle. C) cardiac muscle. D) Two of the above answers are correct.
E) Answers A, B and C are all correct.

16. Compared to smooth muscle, skeletal muscle: A) contracts more rapidly and fatigues more rapidly.
B) contracts more slowly and fatigues more slowly. C) contracts more rapidly and fatigues more slowly.
D) contracts more slowly and fatigues more rapidly. E) is no different from smooth muscle, when it comes to the
speed of contraction and time to fatigue.

17. An example of a fat-soluble vitamin is:
A) vitamin A. B) vitamin B12. C) vitamin E. D) iodine. E) two of the above answers are correct.

18. Because they can accumulate in the body, excess ingestion of which of the following can have toxic effects?
A) fat-soluble vitamins. B) water-soluble vitamins. C) calcium and phosphorus. D) proteins. E) sugars.

19. Animals require 20 basic amino acids to build proteins. Some amino acid are essential amino acids, some would
be called 'nonessential' amino acids. An amino acid that would be called **nonessential**:
A) is not one of the 20 amino acids needed for proteins. B) can be made from other amino acids and other
substances provided in the animal's diet. C) is one not used by the animal to produce proteins. D) must be ingested
in the diet of the animal. E) is less important than an essential amino acid in building proteins.

20. Which of the following choices lists the organs of the human digestive system in the correct order?
Starting from the mouth -

A) pharynx - esophagus - stomach - large intestine - small intestine - anus
B) esophagus - pharynx - stomach - large intestine - small intestine - anus
C) pharynx - stomach - esophagus - small intestine - large intestine - anus
D) esophagus - stomach - pharynx - small intestine - large intestine - anus
E) pharynx - esophagus - stomach - small intestine - large intestine - anus

21. Which of the following is a correct statement about bile salts? A) they are enzymes. B) they are produced by
the pancreas. C) they increase the efficiency of pepsin action. D) they are found in gastric juice.
E) they emulsify fats.

22. The main function of the villi and microvilli on the surface of the small intestine: A) secrete digestive enzymes.
B) enable the small intestine to stretch. C) increase the absorptive surface area. D) produce bile salts. E) help to
break food up into smaller particles.

23. A digestive juice with a pH of 2 probably came from the:
A) mouth. B) pancreas. C) stomach. D) colon. E) last portion of the small intestine.

24. Rhythmic contractions of smooth muscle force food along the digestive tract. This is called:
A) diastasis. B) allosteric movement. C) amoeboid motion. D) peristalsis. E) systole.

25. Which of the following statements are **true** concerning the functions of the liver? I. Create red blood cells.
II. Produce most of the hormones of the body. III. Synthesis of bile. IV. Creation of albumins and globulins.
A) I and III only. B) I, II and IV. C) II, III and IV. D) I, II, III and IV. E) I, III and IV.

26. While food does not directly pass through this organ, hydrolytic enzymes are secreted from this organ into the
lumen of the digestive tract, and these enzymes hydrolyze proteins: A) salivary gland. B) liver.
C) pancreas. D) B and C are both correct. E) A and C are both correct.

27. Once the food monomers have been assimilated, most of the storage of the digested food molecules occurs in the:
 A) colon. B) esophagus. C) stomach. D) liver. **E) small intestine.**
28. Which of the following statements are **true** concerning the functions of the large intestine?
 I. Absorb some vitamins (such as vitamin K) produced by symbiotic bacteria. II. Absorb water. III. Creation of albumins and globulins. IV. Store feces until they are eliminated.
 A) I and II only. **B) I, II and IV.** C) II, III and IV. **D) I, II, III and IV.** E) I, III and IV..
29. How many chambers (atria and ventricles) are there in the frog heart? A) 1. B) 2. **C) 3.** D) 4.
30. Which of the following animals has an open circulatory system? **A) honeybees (an insect).** B) earthworms (an annelid). C) octopus (a cephalopod mollusc). D) birds (a vertebrate). E) jellyfish (a cnidarian).
31. In which type of blood vessel do you see an epithelial layer (called the endothelium)? A) artery. B) vein. C) capillary. D) arteries and veins, but not capillaries. **E) answers A, B and C all have an epithelial layer.**
32. The blood proteins whose primary function is maintaining the osmotic pressure of blood are called:
A) albumins. **B) globulins.** C) fibrinogens. D) immunoglobulins. E) gastrins.
33. In mammals, **all** of the exchange of gases between the blood and the body's tissues occurs in the:
 A) arteries. B) arterioles. **C) capillaries.** D) venules. E) veins.
34. The cells that gives rise to red blood cells, white blood cells and platelets are called:
 A) mast cells. B) nervous cells. **C) stem cells.** D) epithelial cells. E) fibroblasts.
35. In each of the following choices below, blood travels directly from the first structure into the second. However, one choice is incorrect. Which choice is **incorrect**?
A) left ventricle → aorta. B) vena cava → right atrium. C) left atrium → left ventricle. *VENA - right atrium -> ventricle - pulmonary artery -> lungs -> pulmonary vein - left atrium -> left ventricle -> aorta*
D) capillary bed → arteriole. E) right atrium → right ventricle.
36. Veins contain one-way valves that help blood flow to the heart, by preventing backflow. **A) True.** B) False.
37. Deoxygenated blood travels from the rest of the body to the human heart by means of which major blood vessel?
A) axon. **B) pulmonary artery.** C) pulmonary vein. D) vena cava. E) aorta
38. The pathway of urine from kidney to the outside is:
A) kidney - ureter - bladder - epididymis - urethra.
 B) kidney - ureter - gall bladder - bladder - urethra.
 C) kidney - urethra - bladder - ureter.
 D) kidney - ureter - liver - gall bladder - bladder - ureter.
 E) kidney - ureter - bladder - urethra.
39. Platelets are involved in: A) red blood cell formation. B) white blood cell formation.
C) blood clotting. D) antibody-antigen reactions. E) none of the above answers are correct.
40. In what organism would you see a 'lung' for gas exchange?
 A) crustaceans. B) pulmonate land snails and slugs. C) insects. D) jellyfish. **E) flatworms.**
41. Countercurrent exchange in the fish gill helps to maximize:
A) diffusion of oxygen. B) phagocytosis. C) blood pressure. D) active transport. E) osmosis.
42. An animal equipped with nephrons for collection of nitrogenous wastes:
 A) insect. **B) human.** C) earthworm. D) flatworm. E) an amoeba.

43. In actively respiring tissues with high CO_2 and hydrogen ion levels, oxygen is ____ likely to be released from hemoglobin as a result of the Bohr Effect. (A) more. B) less.
44. The smallest unit of the human respiratory system, where gas exchange occurs between respired air and the blood: A) glomerulus. B) Haversian canals. C) corpuscle. D) intercalated disks. (E) alveoli.
45. Which of the following would **not** be considered part of the nonspecific defenses?
A) the skin. B) lysozyme in tears. C) acidic gastric juices. (D) antibodies. E) mucus.
46. The exchange of gases between human blood and the air takes place by:
(A) diffusion. B) osmosis. C) active transport. D) bulk flow. E) facilitated diffusion.
47. Plasma cells are _____ that actively secrete antibodies.
A) macrophages. B) neutrophils. C) basophils. D) T cells. (E) B cells.
48. Which antibody type is a monomer, and is involved in allergic reactions?
A) IgA. B) IgG. C) IgE. D) IgM. (E) IgD.
49. Which of the following cell types is responsible for rapidly initiating a secondary immune response?
A) T suppressor cells. B) macrophages. (C) memory cells. D) eosinophils. E) mast cells.
50. The major metabolic waste excreted by humans is:
A) ammonia. B) uric acid. (C) urea. D) glycine. E) carbon dioxide.