

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!

Name (PRINT!) _____

Student # _____

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. In the human excretory (urinary) system, the urine is carried from the bladder to the outside of your body through a tube called the: A) collecting duct. B) renal medulla. C) urethra. D) nephridiopore. E) ureter.
2. Lampreys are in which subphylum?
A) Urochordata. B) Mammalia. C) Craniata. D) Cephalochordata. E) Chordata.
↳ cephalochordata
- * 3. The human brain's respiratory control centers primarily responds to changes in which of the following?
A) the concentration of water in the blood. B) the pH (CO₂ concentrations) of the blood.
 C) the amount of oxygen in the alveolus. D) the concentration of oxygen in the air.
4. Oxygen diffuses to the tissues of terrestrial arthropods (such as the ants and beetles) through:
A) blood contained in arteries. B) Malpighian tubules. C) lungs. D) ommatidia. E) tracheae.
5. Which of the following groups has at least some species with a four-chambered heart?
A) Aves. B) Reptilia. C) Amphibia. D) Answers B and C are both correct.
 E) Answers A and B are both correct.
birds crocodiles
- * 6. The cells that gives rise to red blood cells, white blood cells and platelets are called:
 A) mast cells. B) nervous cells. C) monocytes. D) stem cells. E) fibroblasts.
7. Veins contain many two-way valves that help blood flow to and from the heart, depending on blood pressure. A) True. B) false.
8. Which of the following is a fat soluble vitamin that acts as an antioxidant?
 A) vitamin A. ~~B) vitamin B.~~ ~~C) vitamin C.~~ D) vitamin D. E) vitamin E.
*Water - B, C
P, C*
- * 9. In what type of tissue would you find intercalated disks?
A) connective. B) epithelial. C) cortex. D) muscular. E) meristem.
↑
- * 10. What is the difference between the pulmonary and systemic circulation in mammals?
 A) Systemic arteries carry oxygenated blood, whereas pulmonary arteries carry deoxygenated blood.
B) Systemic circulation carries deoxygenated blood only, whereas pulmonary circulation carries oxygenated blood.
C) Systemic circulation carries oxygenated blood only, whereas pulmonary circulation carries deoxygenated blood.
D) Pulmonary circulation would carry blood through the muscles of the body, whereas systemic circulation carries blood through the lungs.
E) the veins of the pulmonary system carry oxygenated blood to the muscles, while the veins of the systemic circulation carry deoxygenated blood back to the muscles from the heart.
11. The blood proteins involved in maintaining the osmotic pressure of blood are called:
A) immunoglobulins. B) globulins. C) fibrinogens. D) albumins. E) gastrins.
- * 12. Living members of which vertebrate class possess feathers and horned beaks?
 A) Aves. B) Reptilia. C) Amphibia. D) Mammalia. E) Osteichthyes.

13. Which antibody type is a monomer, and is involved in B-cell activation?
 A) IgA. B) IgG. C) IgE. D) IgM. **(E) IgD.**
14. On vacation, you found an animal. It was a marine filter feeder. The animal is segmented, with chevron-shaped muscle blocks arranged along the notochord. It has no bones. The adult swims, and the notochord is retained in the adult. It is in the subphylum:
 A) Craniata. B) Hemichordata. **(C) Cephalochordata.** D) Urochordata. E) Echinodermata.
15. Which of the following is analogous to the insects' Malpighian tubules, with respect to its function?
 A) mammalian pancreas. B) human appendix. C) annelid metanephridium. **(D) annelid intestine.**
 E) mammalian spleen.
16. The Chordate group that has a rasping tongue with teeth, cartilaginous skeleton, lacks jaws and vertebrae, retains the notochord, no paired appendages, and one pair of semicircular canals:
 A) lancelets. B) cartilaginous fish. **(C) hagfish.** D) bony fish. E) lampreys.
17. You are an exobiologist 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 three-chambered heart, jaws, lungs, a bony endoskeleton, and the adult is found in water. It has a leathery, shelled egg. You would place it which vertebrate group?
(A) Osteichthyes. B) Mammalia. C) Aves. D) Reptilia. E) Chondrichthyes.
18. You have ingested a poison that inhibits cells that produce the hydrolytic enzyme trypsin. These cells are located in the:
 A) liver. B) pancreas. **(C) stomach.** **(D) small Intestine.** E) salivary gland.
19. To which of the following groups do humans belong?
 A) ammonotelic animals. **(B) ureotelic animals.** C) uricotelic animals.
20. In a human nephron, what lies between the Bowman's capsule and the loop of Henle?
 A) the lacunae. B) the ureter. **(C) the proximal convoluted tubules.** D) the Haversian canal.
 E) the distal convoluted tubules.
21. The material that stimulates the gallbladder to release bile is:
 A) zymogen. **(B) secretin.** C) gastrin. D) glucagon. E) cholecystokinin (CCK).
22. The most abundant vertebrate group, in terms of numbers of species:
 A) Aves. B) Reptilia. C) Amphibia. **(D) Mammalia.** E) Osteichthyes.
23. Both roundworms and flatworms have complete digestive systems. A) True.
(B) False, flatworms do, but roundworms do not. C) False, roundworms do, but flatworms do not.
 D) False, both animals have incomplete digestive tracts.
24. Countercurrent exchange in the fish gill helps to maximize:
(A) diffusion of oxygen to blood. B) phagocytosis. C) blood pressure. D) active transport. E) osmosis.
25. Receiving an injection of specific, ready-made antibodies is an example of:
 A) artificially acquired passive immunity. **(B) artificially acquired active immunity.**
(C) naturally acquired passive immunity. **(D) naturally acquired active immunity.**
26. On a windy day, the wind carries off additional heat energy from a dog, compared to the heat energy lost on a still day. Which method of heat loss or gain is primarily responsible for the additional heat loss?
 A) conduction. **(B) convection.** C) radiation. D) evaporation. E) metabolism.

27. Absorption of water is one major function of which of the following structures?

- A) lungs. B) stomach. **C) large intestine.** D) appendix. E) pancreas.

28. On vacation, you found a small chordate animal. As adults, the animal loses the notochord (which is present in the larvae) and the adult lives as a benthic marine filter-feeder with an outer coat called the tunic. The pharynx is expanded into a basket-like structure. It is in the subphylum:

- A) Craniata. B) Hemichordata. C) Cephalochordata. **D) Urochordata.** E) Echinodermata.

29. Which of the following choices correctly puts the portions of your small intestine in the correct order, from anterior to posterior? **A) jejunum → duodenum → ileum.** B) ileum → duodenum → jejunum.
C) duodenum → jejunum → ileum. D) duodenum → ileum → jejunum.
E) ileum → jejunum → duodenum.

30. What is the largest lymphatic organ in humans?

- A) the liver. B) the gall bladder. C) the thymus. **D) the spleen.** E) the kidney.

31. Which of the following vertebrate groups is not considered an amniote tetrapod?

- A) hagfish.** B) mammals. C) reptiles. **D) birds.** **E) Two of the above answers are not amniote tetrapods.**

32. An organism that has a narrow tolerance range to temperature would be called:

- A) monothermal. B) eurythermal. C) hypothermal. D) polythermal. **E) stenothermal.**

33. Which of the following occurs with the exhalation of air from human lungs? A) Alveolar sacs shrink by muscle contraction around each alveolus. **B) The diaphragm relaxes.** C) The epiglottis closes.

- D) The rib cage expands.** E) the stomach contracts.

34. Carbon dioxide is transported in blood primarily in the form of: A) dissolved carbon dioxide gas.

- B) bicarbonate (HCO_3^-).** C) carbonic acid (H_2CO_3). D) carbon monoxide (CO).
E) carbohydrates (CHO).

35. Which of the following is not a general characteristic shared by all craniates? **A) extracellular digestion.**

- B) complete digestive tract.** C) closed circulatory system. D) determinate cleavage. E) ionic regulators.

36. Reptiles belong to the subphylum:

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

37. Plasma cells are _____ that actively secrete antibodies.

- A) macrophages. B) neutrophils. **C) B cells.** D) T cells. E) basophils.

38. The secretion of acid in the stomach is controlled by:

- A) zymogen. **B) secretin.** C) gastrin. D) glucagon. E) cholecystokinin (CCK).

39. 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.
D) capillary bed → arteriole. E) right ventricle → pulmonary artery.

40. The neuron consists of all of the following things except:

- A) axon. B) cell body. C) dendrites. **D) canaliculi.** E) All of the above are parts of the neuron.

LA LV RA BC VC
RA RV PA LC PV

CA/LV/A BC/VC
PA LC PV

41. A new species of vertebrate was discovered. It has a three-chambered heart, gills that were lost as the juvenile tadpole metamorphosed into an adult, and it could be found in moist terrestrial environments and in the water. It breathes primarily through its skin. A knowledgeable biologist would also predict it also had:
 A) fur. B) bony endoskeleton. C) an amniotic egg. D) a tunic of cellulose. E) an operculum.
42. An animal equipped with protonephridia for collection of nitrogenous wastes:
 A) insect. B) human. C) flatworm. D) earthworm. E) an amoeba.
43. All of the following are functions of the mammalian kidney **except** one. Which one is **incorrect**?
 A) water retention. B) filtration of blood. C) excretion of nitrogenous waste.
 D) regulation of salt balance in the blood. E) synthesis of urea from ammonia.
44. Which of the following groups (if any) is **not** a gnathostome?
 A) bony fish. B) amphibians. C) mammals. D) birds. E) all of the previous answers are gnathostomes.
45. You take a prescription drug that inhibits the production of bicarbonate-rich secretions that enter into your digestive tract. This secretion is produced in the:
 A) liver. B) gall bladder. C) stomach. D) adrenal glands. E) pancreas.
46. You accidentally ingested a poisonous compound that slows down the activities of epithelial tissues. Which place would you immediately see an effect? A) lining of the gut. B) cartilage. C) skeletal muscle tissues inside the lacunae of bone. D) adipose tissue surrounding the kidneys. E) two of the above answers are correct.
47. One **disadvantage** to endotherms is that they must consume much more food per unit time, compared to ectotherms of similar size. A) True. B) False.
48. The muscle type that contracts under voluntary control and contracts the most rapidly upon stimulation is called _____ muscle. A) skeletal. B) smooth. C) cardiac.
49. In humans, the esophagus and trachea are both connected to (open into) the:
 A) stomach. B) small intestines. C) pharynx. D) rectum. E) nasal cavity.
50. Which mammal group lays eggs that hatch outside of the mother?
 A) monotreme mammals. B) marsupial mammals. C) eutherian mammals. D) no mammals lay eggs.