

**BIOS 100 - Exam 4- Fall, 2005**  
**Michael Muller, Instructor**  
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Name: \_\_\_\_\_

TA: \_\_\_\_\_

The exam consists of 50 multiple guess questions and six pages. Please bubble in your name, last name first. Please be sure you use the name with which you are registered here at UIC and not a nickname. If you only learn one thing from college, please learn that whenever you fill out one of these forms, you should use a #2 pencil. Pen just won't work. Really, it won't. Good luck! Oh, the answer to question 26 is D. No kidding. I've been very disappointed - not one person has commented on the fact that I'm giving away answers on the test header. Not one. What's a guy gotta do to get some love around here?

1. Which of the following systems does not utilize the circulatory system to perform its functions?  
A. Respiratory system      **B. Nervous system**      C. Endocrine system  
D. Immune System      E. Digestive system
2. Which of the following is NOT a primary function of the circulatory system?  
A. Thermoregulation      B. Cellular communication      C. Removal of wastes  
D. Transport of nutrients      **E. All of the above are functions of the circulatory system**
3. Which of the following statements (A-D) about veins are FALSE? If statements A-D are true, then choose E.  
**A. Veins always carry blood away from the heart**  
B. Veins in the systemic circuit typically carry deoxygenated blood  
C. Veins contain valves to prevent backflow of blood  
D. Veins are typically located closer to the skin than arteries  
E. All of the above statements about veins are TRUE

Use the key below to answer questions 4-6. Choices may be used once, more than once, or not at all. Each question only has one correct answer.

A. Arteries    B. Arterioles      C. Capillaries      D. Venules    E. Veins

4. These blood vessels have the greatest total cross-sectional area **C**
5. Blood pressure is greatest in these blood vessels **A**
6. Blood velocity is slowest in these blood vessels **C**
7. Which of the following is the correct pathway that blood takes through the heart to oxygenate blood?  
A. Vena cava - Left Atrium - Left Ventricle - Pulmonary Vein - Lungs - Pulmonary Artery - Right Atrium - Right Ventricle - Aorta  
B. Vena cava - Left Atrium - Left Ventricle - Pulmonary Artery - Lungs - Pulmonary Vein - Right Atrium - Right Ventricle - Aorta  
C. Vena cava - Right Atrium - Right Ventricle - Pulmonary Vein - Lungs - Pulmonary Artery - Left Atrium - Left Ventricle - Aorta  
**D. Vena cava - Right Atrium - Right Ventricle - Pulmonary Artery - Lungs - Pulmonary Vein - Left Atrium - Left Ventricle - Aorta**  
E. None of the above

8. During inhalation, the diaphragm is \_\_\_\_\_. During exhalation, the diaphragm is \_\_\_\_\_.
- A. contracting; contracting                      **B. contracting; relaxing**  
 C. relaxing; contracting                          D. relaxing; relaxing
9. How is most of the CO<sub>2</sub> removed from the cells by the blood
- A. Directly dissolved in the plasma              B. Bound to hemoglobin  
**C. As bicarbonate (HCO<sub>3</sub><sup>-</sup>)**                      D. A & B
10. Which of the following statements (A-D) about gas exchange in the lungs is FALSE? If statements A-D are true, then choose E.
- A. Gas exchange occurs across the thin walls of the alveoli sacs  
 B. There is a counter-current flow of blood and air in the lungs  
 C. Oxygen diffuses down its concentration gradient from the air to the blood  
 D. Carbonic anhydrase catalyzed the conversion of H<sub>2</sub>CO<sub>3</sub> to CO<sub>2</sub> and H<sub>2</sub>O  
**E. All of the above statements about gas exchange in the lungs are TRUE**
11. Which of the molecules below can form the strongest bond with oxygen?
- A. Myoglobin**    B. Llama hemoglobin  
 C. Adult maternal hemoglobin                      D. Infant fetal hemoglobin

Use the key below to answer questions 12-15.

I. Mouth      II. Stomach      III. Small Intestine      IV. Large Intestine

12. Chemical digestion occurs in this/these organs:
- A. III only      B. II, III      **C. I, II, III**      D. I, II, III, IV      E. None of the above
13. Absorption of nutrients occurs in this/these organs:
- A. III only**      B. II, III      C. I, III      D. I, II, III,      E. None of the above
14. Bacteria are killed by acids in this/these organs:
- A. I only      **B. II only**      C. I, II      D. I, II, III      E. None of the above
15. This/these organs are involved in water reabsorption and compaction:
- A. III only      **B. IV only**      C. III, IV      D. II, III      E. None of the above
16. Which of the following statements (A-D) about reabsorption in the proximal tubule is false? If statements A-D are true, then choose E
- A. Na<sup>+</sup>/K<sup>+</sup> pumps in the basolateral membranes of the epithelial cells of the proximal tubule pump Na<sup>+</sup> out of the epithelial cells  
 B. Numerous Na<sup>+</sup> symports allow molecules like Cl<sup>-</sup>, glucose, and vitamins to enter the epithelial cells down a concentration gradient  
 C. Water flows into the epithelial cells via osmosis  
 D. Glucose and vitamins enter the blood through channels  
**E. All of the above statements about reabsorption in the proximal tubule are TRUE**



25. What is the name of the network of capillaries that reabsorbs water and ions from the filtrate and the surrounding tissue?
- A. The Bowman's capsule    **B. The vasa recta**    C. The Loop of Henle  
D. The glomerulus    E. None of the above
26. Which of the following is not an example of a paracrine action?
- A. The release of neurotransmitters at a synapse  
B. The release of interleukins by a macrophage APC to activate a Helper T-Cell  
C. The release of interleukins by a macrophage APC to activate a Cytotoxic T-Cell  
**D. The activation of a B-Cell through direct contact with a pathogen**  
E. All of the above are examples of paracrine actions
27. A hormone can have different effects on different target cells
- A. True**    B. False
28. An agonist is:
- A. A hormone that causes pain  
B. A hormone that blocks pain  
**C. A hormone that binds to a receptor and induces all post-receptor events**  
D. A hormone that binds to a receptor and blocks other hormones from binding  
E. None of the above
29. Which of the following statements (A-D) about antagonists are false? If statements A-D are true, then choose E
- A. All antagonistic effects are bad (harmful) to the body**  
B. Antagonists act by blocking the effects of agonists  
C. Many drugs are antagonists  
D. Antagonists cannot trigger cellular responses themselves  
E. All of the above statements about antagonists are TRUE
30. Which of the following statements about neurons are false? (Hey, I took pity on you, one of them actually IS false... :)
- A. The direction of a nervous impulse is from the dendrites to the cell body to the axon  
B. An impulse will travel much faster down a myelinated axon than an unmyelinated axon  
C. A synapse is the junction between a neuron and another cell  
**D. In a neuron at rest, the inside of the neuron is more positively charged than the outside**  
E. Myelinated neurons have Schwann cells associated with them.
31. What is taking place during the refractory period?
- A. The Na<sup>+</sup> / K<sup>+</sup> are reestablishing the electrochemical potential in the neuron**  
B. Na<sup>+</sup> channels are opening, allowing Na<sup>+</sup> to rush in  
C. Neurotransmitters are crossing the synaptic cleft  
D. Saltatory movement is taking place  
E. None of the above

32. An action potential:
- A. Allows a muscle to relax
  - C. Is all or none**
  - E. None of the above
  - B. Can vary depending upon stimulus intensity
  - D. Is what happens at a synapse
33. What is taking place during depolarization of a neuron?
- A. The Na<sup>+</sup> / K<sup>+</sup> are reestablishing the electrochemical potential in the neuron
  - B. Na<sup>+</sup> channels are opening, allowing Na<sup>+</sup> to rush in**
  - C. Neurotransmitters are crossing the synaptic cleft
  - D. Saltatory movement is taking place
  - E. None of the above
34. Which part of the brain contains the majority of the structures responsible for regulating breathing and the heartbeat?
- A. The forebrain
  - B. The midbrain
  - C. The hindbrain**
35. What is the function of the hypothalamus?
- A. It is involved in long-term memory
  - B. It is a relay station for sensory stimuli
  - C. It is involved in maintaining homeostasis**
  - D. It is involved in motor control
  - E. None of the above

Use the key below to answer questions 36-38. Choices may be used once, more than once, or not at all.

- A. The frontal lobe
  - B. The temporal lobe
  - C. The parietal lobe
  - D. The occipital lobe
36. Which lobe of the cerebral cortex is important in integrating visual stimuli? **D**
37. Which lobe of the cerebral cortex is important in regulating thought processes? **A**
38. Which lobe of the cerebral cortex is important in integrating auditory (sound) stimuli? **B**
39. The primary function of the cerebellum is in regulating:
- A. Motor control**
  - B. Speech
  - C. Heartbeat
  - D. Digestion
  - E. None of the above
40. Which of the below is a relay station for all sensory input (except olfaction)?
- A. Thalamus**
  - B. Hypothalamus
  - C. Lateral Geniculate Nucleus (LGN)
  - D. Substantia Nigra
  - E. Reticular Formation
41. Damage to this can lead to Parkinson's Disease:
- A. Thalamus
  - B. Hypothalamus
  - C. Lateral Geniculate Nucleus (LGN)
  - D. Substantia Nigra**
  - E. Reticular Formation

42. Which line of defense is most effective in keeping the body free of pathogens?
- The first line of defense (skin and mucous membranes)**
  - The second line of defense (phagocytes, macrophages, etc)
  - The third line of defense (B-Cells, Cytotoxic T-Cells, etc)
  - None of the above
43. Which of the following statements (A-D) about the skin and mucous membrane's role in the immune system is false? If statements A-D are true, then choose E.
- The skin acts as a physical barrier preventing the entry of pathogens into the body
  - Mucous membranes secrete lysozymes that can kill bacteria
  - The skin has a high pH which most pathogens cannot tolerate**
  - The skin harbors colonies of harmless bacteria, making it difficult for pathogens to become established
  - All of the above statements about the skin and mucous membranes are TRUE
44. Which of the following can become antigen-presenting cells (APC's)?
- Macrophages**
  - Nutrinophils
  - Basophils
  - Eosinophils
  - A & B
45. In order for a Cytotoxic T-Cell to become active, it must receive signals from:
- Helper T-Cell
  - Macrophage
  - B-Cell
  - A & B
  - A, B, & C
- I accepted either A or D - technically, it doesn't receive a signal from a macrophage, but an APC, but I was sloppy when I wrote the exam, so I gave credit for both.*
46. Which of the statements (A-C) about the activation of a virgin or memory B-Cell is false? If statements A-C are true, then choose E.
- A B-Cell must receive a chemical signal from an antigen-presenting cell to become activated
  - A helper T-cell must receive a chemical signal from an antigen-presenting cell to become activated
  - A B-Cell must receive a chemical signal from an antigen-presenting cell to become activated
  - All of the above statements about the activation of memory or virgin B-Cells are TRUE
- There are so many things wrong with this question, it wasn't funny...*
47. What is the function of antibodies?
- Bind to any non-self cell, killing them
  - Bind to any non-self cell, marking them for other cells
  - Hunt down and kill specific pathogens
  - Bind to specific pathogens, marking them for other cells and inhibiting their growth**
  - None of the above
48. Which of the following is NOT a part of the central nervous system
- Cerebellum
  - Pons
  - Spinal Cord
  - Eyes**
  - All of the above are part of the central nervous system

49. Which cell type is incorrectly matched with its function?
- A. **Macrophages - Inform B lymphocytes that a specific antigen is present**
  - B. Helper T cells - produce and secrete chemicals which activate cytotoxic T-cells and B-cells
  - C. Cytotoxic T cells - T lymphocytes that eliminate specific pathogens
  - D. B cells - produce antibodies
  - E. All of the above are correctly matched with their function
50. Which of the following is an antigen?
- A. An antibody
  - B. Anti-diuretic hormone (ADH)
  - C. **The proteins of the ABO blood typing**
  - D. Neurotransmitters
  - E. None of the above
51. Which of the following does NOT occur during an inflammation event?
- A. Localized redness, swelling, and pain
  - B. Increased leakiness of local capillaries
  - C. Interleukins secreted enhance leucocyte ability to protect the body
  - D. **Interleukins secreted act as a stimulate to increase the body's activity level**
  - E. All of the above occur during an inflammation event
52. Which of the following cell types is NOT a part of the body's second line of defense (active, non-specific)
- A. Macrophage
  - B. Eosinophils
  - C. **Helper T Cells**
  - D. Basophils
  - E. Nutrinophils
53. After a pathogen infestation has been eliminated, the body has memory Helper T-Cells, B-Cells, and Cytotoxic T-Cells. These memory cells will speed up the immune response should that same pathogen invade the body again.
- A. **True**
  - B. False
54. What color flannel shirt has Mike worn every day for the past few months?
- A. Black
  - B. Blue
  - C. **Reddish Purple**
  - D. Yellow
  - E. Brown