

**BIOS 100 - Exam 4 - Fall, 2003**  
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**5 December, 2003**

Name: \_\_\_\_\_

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

The exam consists of 50 odd multiple choice questions and seven 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. The capital of Bulgaria is Sofia. Good luck!

1. In which part of the nephron does the process of filtration take place?  
A. glomerulus (renal corpuscle)                      B. distal tubule  
C. collecting duct    D. Loop of Henle
  
2. In which part of the nephron does the fluid get diluted by active pumping of Na out of the tubule?  
A. glomerulus (renal corpuscle)                      B. distal tubule  
C. collecting duct    D. Loop of Henle
  
3. Where is the hormone ADH (antidiuretic hormone) made/ released  
A. Juxtaglomerular apparatus                      B. cells lining atria of heart  
C. cells in hypothalamus region of brain                      D. cells in the nephron's collecting ducts
  
4. About how many ml of urine will have you formed during this 50 minute exam period?  
A. 1 liter                      B. 1 ml                      C. 50 ml  
D. about the volume in one diet coke can
  
5. What is a typical osmolarity of the extracellular fluids of land animals?  
A. 150 mOsmoles/L                      B. 300 mOsmoles/l  
C. 1 mOsmoles/L                      D. 1000 mOsmoles/L
  
6. Which animal is constantly gaining water from its environment by osmosis?  
A. land mammals                      B. marine fishes  
C. freshwataer fishes                      D. all of the above
  
7. Which of the following is NOT a function of the circulatory system?  
A. Thermoregulation                      B. Reproduction  
C. Homeostasis                      D. Immunity  
E. All of the above are functions of the immune system
  
8. These are involved in blood clotting  
A. Erythrocytes                      B. Leucocytes  
C. Macrophages                      D. Platelets  
E. None of the above

9. Which of the following is the correct pathway that blood takes through the heart to oxygenate blood?
- A. Vena cava - Right Atrium - Right Ventricle - Pulmonary Vein - Lungs - Pulmonary Artery - Left Atrium - Left Ventricle - Aorta
  - B. Vena cava - Right Atrium - Right Ventricle - Pulmonary Artery - Lungs - Pulmonary Vein - Left Atrium - Left Ventricle - Aorta
  - C. Vena cava - Left Atrium - Left Ventricle - Pulmonary Vein - Lungs - Pulmonary Artery - Right Atrium - Right Ventricle - Aorta
  - D. Vena cava - Left Atrium - Left Ventricle - Pulmonary Artery - Lungs - Pulmonary Vein - Right Atrium - Right Ventricle - Aorta
  - E. None of the above

Use the key below to answer questions 10 to 12:

- A. Arteries    B. Veins    C. Capillaries    D. None of the above

10. This type of blood vessel has valves to prevent backflow
11. This type of blood vessel can become leaky to cause inflammation in an immune response
12. This type of blood vessel always carries oxygenated blood
13. Which of the following statements about capillaries is FALSE?
- A. Capillary walls are one cell layer thick
  - B. Control of blood flow into capillary beds is done by nerve-controlled sphincters.
  - C. Blood pressure is greatest in the capillaries
  - D. Some capillaries have small pores between the cells of the capillary wall, allowing materials to flow in and out of capillaries as well as the passage of white blood cells
  - E. All of the above statements about capillaries are TRUE
14. The termination of bronchioles into blind pouches are called
- A. Alveoli                      B. Bronchial sacs                      C. Nephrons
  - D. Ventilators                      E. None of the above
15. The function of the epiglottis is to:
- A. prevent food from traveling down the bronchi to the lungs
  - B. to aid in speech
  - C. to keep the bronchi from collapsing
  - D. facilitate gas exchange in the lungs
  - E. None of the above
16. . How is the majority of CO<sub>2</sub> produced by cells returned to the lungs?
- A. Dissolved in the plasma                      B. Bound to hemoglobin
  - C. By the leucocytes                      D. Converted to HCO<sub>3</sub><sup>-</sup>

17. Where is the partial pressure (concentration) of oxygen greatest?  
 A. In the air                      B. In the alveoli                      C. In the aorta  
 D. In the interstitial fluid      E. None of the above
18. When you inhale, your diaphragm is \_\_\_\_\_  
 A. Contracting                      B. Relaxing
19. This is frequently called the pacemaker because it keeps the heartbeat regular  
 A. The SA node                      B. The AV node                      C. The RCA node  
 D. The AV valve                      E. None of the above
20. These cells contain hemoglobin.  
 A. Erythrocytes                      B. Leucocytes                      C. Macrophages  
 D. Platelets                              E. None of the above
21. Trace the flow of food through the digestive system  
 A. Mouth - Esophagus - Stomach - Small Intestine - Large Intestine - Anus - Rectum  
 B. Mouth - Esophagus - Stomach - Small Intestine - Large Intestine - Rectum - Anus  
 C. Mouth - Esophagus - Stomach - Large Intestine - Small Intestine - Rectum - Anus  
 D. Mouth - Stomach - Esophagus - Large Intestine - Small Intestine - Rectum - Anus  
 E. None of the above

Matching - Use the key below to answer questions 22 - 25

- |              |                    |
|--------------|--------------------|
| I. Liver     | IV. Stomach        |
| II. Pancreas | V. Small Intestine |
| III. Mouth   | VI. Intestine      |

22. Food does not travel through this/these, but chemicals and enzymes that aid in digestion are produced  
 A. I                      B. II                      C. III                      D. I, II                      E. I, II, III
23. This is where most of the absorption of food takes place  
 A. IV                      B. V                      C. VI                      D. IV, V                      E. IV, V, VI
24. This is where compaction takes place  
 A. IV                      B. V                      C. VI                      D. IV, V                      E. IV, V, VI
25. Both mechanical and chemical digestion occur here  
 A. III                      B. IV                      C. V                      D. III, IV                      E. III, IV, V
26. What is the function of bile?  
 A. To digest fats                      B. To aid in absorption in the stomach  
 C. To emulsify fats                      D. To lubricate the small intestine  
 E. None of the above



36. Which of the following statements about inflammation is FALSE?
- Inflammation causes localized redness, swelling, heat, and pain
  - Inflammation promotes macrophage activity
  - Inflammation causes the capillary walls to become tight, preventing bacterial access to the bloodstream
  - Inflammation causes macrophages to release interleukins which promote drowsiness
  - All of the above statements about inflammation are TRUE
37. Which cell type is incorrectly matched with its function?
- Macrophages - Inform T lymphocytes that a specific antigen is present
  - Helper T cells - produce and secrete chemicals which promote large numbers of effector and memory cells
  - Cytotoxic T cells - T lymphocytes that eliminate infected body cells and tumor cells
  - B cells - produce antibodies
  - All of the above are correctly matched with their function
38. How does a macrophage determine whether a cell is a self cell or a non-self cell?
- By the hormones the cell in question secretes
  - By the cell in question's ability to bind to hormones secreted by the macrophage
  - By the ability of the cell in question to produce to antibodies
  - By the pattern and types of antigens present on the cell in question
  - None of the above
39. Which cell type can become an antigen-presenting cell?
- |               |                      |                     |
|---------------|----------------------|---------------------|
| A. Macrophage | B. Helper T-cell     | C. Cytotoxic T-cell |
| D. B-cell     | E. None of the above |                     |
40. In order for a virgin or memory cytotoxic T-cell to become active, what must happen?
- The appropriate antigen-presenting cell must bind to the cytotoxic T-cell
  - The appropriate helper T-cell must secrete interleukins to activate the cytotoxic T-cell
  - The cytotoxic T-cell must encounter the pathogen
  - A & B
  - A, B, & C
41. What is the function of antibodies?
- Hunt down and kill specific pathogens
  - Bind to specific pathogens, marking them for other cells and inhibiting their growth
  - Bind to any non-self cell, killing them
  - Bind to any non-self cell, marking them for other cells
  - None of the above
42. A memory B cell will retain its ability to bind to a specific antigen-MHC complex every time it divides by mitosis.
- |         |          |
|---------|----------|
| A. True | B. False |
|---------|----------|



48. Which of the following reactants are thought by scientists to have combined to produce formaldehyde and cyanide, the first reduced-carbon products?
- A. atmospheric molecules:  $\text{NH}_3$ ,  $\text{CO}_2$ ,  $\text{N}_2$ ,  $\text{H}_2\text{O}$
  - B. energy from sunlight
  - C. energy from heat
  - D. A and B are correct.
  - E. A and C are correct
49. All of the following are properties of living organisms EXCEPT:
- A. Order
  - B. Homeostasis
  - C. Locomotion
  - D. Evolutionary Adaptation
  - E. All of the above are basic properties of life
50. This layer of the earth is the thinnest and the lightest (less dense)
- A. Crust
  - B. Mantle
  - C. Outer Core
  - D. Inner Core
51. Which of the organs below has the greatest internal surface area?
- A. Mouth
  - B. Stomach
  - C. Small Intestine
  - D. Large Intestine
52. The ventricles of the heart are contracting during the \_\_\_\_\_
- A. Systole
  - B. Parastole
  - C. Diastole
  - D. Eustole
53. What is a main function of the cerebellum?
- A. Center of learning
  - B. Control heartbeat and breathing
  - C. Smoothing out movements
  - D. Seat of conscious thought
54. What injury did Mike sustain during the last portion of the class?
- A. A broken foot (ankle)
  - B. A broken arm (elbow)
  - C. A tooth knocked out
  - D. A torn rotator cuff