

**BIOS 100 - Summer 2006**  
**Exam III, 26 July, 2006**  
**Michael Muller, Instructor**

**Name:**

**TA:**

This exam consists of 52 questions over 7 pages. Please check to see that all the pages are present before you begin. Use a #2 pencil and bubble in all answers. Your score will be posted on the UIC Blackboard site as soon as they are in. No kidding. Good Luck!

1. When does crossing over occur?  
A. During prophase of mitosis  
C. During prophase II of meiosis  
E. B & C  
**B. During prophase I of meiosis**  
D. A & B
2. After meiosis, what types of cells will you have?  
A. Two genetically identical daughter cells  
C. Four genetically identical daughter cells  
E. None of the above  
B. Two genetically unique daughter cells  
**D. Four genetically unique daughter cells**
3. During what stage of the cell cycle would you expect helicase activity to be the greatest?  
A. G0      B. G1      C. G2      **D. S**      E. M
4. What is a non-disjunction?  
A. When chromosomes fail to properly fuse during fertilization  
B. When chromosomes fail to properly line up during metaphase of mitosis  
C. When chromosomes fail to properly line up during metaphase I of meiosis  
**D. When chromosomes fail to properly separate during anaphase I or II of meiosis**  
E. None of the above
5. Which of the following statements (A-D) about cyclins and associated molecules is FALSE? If statements A-D are true, then choose E.  
A. Cyclin levels are variable throughout the cell cycle  
B. Cyclin levels are highest at the end of G2 and beginning of the M stages of the cell cycle  
C. Cyclins and cyclin-dependent kinases (CDK's) combine to form maturation MPF complexes  
D. MPF promotes mitosis, and initiates processes to destroy cyclins  
**E. All of the above statements are TRUE.**
6. Which of the following characteristics would you NOT expect to find in a monocot?  
A. Fibrous root system  
**C. Secondary xylem**  
E. Parallel venation in the leaves  
B. Tepals  
D. Fruits
7. When a vascular cambium divides via an additive division, a vascular cambial cell and what is produced?  
**A. A xylem or phloem cell**  
C. Always a xylem cell  
E. None of the above  
B. Another vascular cambium cell  
D. Always a phloem cell



Use the key to answer questions 15 - 18

I. Bryophytes (mosses)

II. Pteridophytes (ferns)

III. Gymnosperms (pines)

IV. Angiosperms (flowering plants)

15. This/these plants produce seeds  
A. IV only    **B. III & IV**    C. II, III, IV    D. I, II, III, IV    E. None of the above
16. This/these plants have chlorophyll A & B and store starch:  
A. IV only    B. III & IV    C. II, III, IV    **D. I, II, III, IV**    E. None of the above
17. This/these plants have vascular tissue:  
A. IV only    B. III & IV    **C. II, III, IV**    D. I, II, III, IV    E. None of the above
18. This/these plants have fruits:  
**A. IV only**    B. III & IV    C. II, III, IV    D. I, II, III, IV    E. None of the above
19. Which of the following statements (A-D) about seed plants is FALSE? If statements A-D are true, then choose E.  
A. All seed plants have vascular tissue  
B. All seed plants have ovules  
C. Viable seeds consist of a seed coat, and embryo, and food for the embryo  
**D. Both gymnosperms and angiosperms exhibit double fertilization**  
E. All of the above statements about seed plants are TRUE
20. Flowers pollinated by birds are typically:  
**A. Red**    B. Yellow    C. White    D. Blue    E. Green
21. A fruit is a ripened:  
A. Ovule    **B. Ovary**    C. Pistil    D. Pollen    E. Anther
22. In a pine tree, the female gametophyte is the:  
**A. Egg sac**    B. Ovule    C. Ovary    D. Seed    E. Pollen
23. Which of the following statements (A-D) about capillaries is FALSE? If statements A-D are true, then choose E.  
A. Capillaries are the thinnest-walled vessels and have the lowest flow velocity of any type of blood vessel  
B. During an inflammation, mast cells secrete chemicals which make the walls of the capillaries more porous  
C. Precapillary sphincters regulate the amount of blood entering the capillary beds  
D. When your body is overheating, blood flow to the capillaries increases to dissipate the excess heat  
**E. All of the above statements about capillaries are TRUE**
24. Which side of the heart is involved in pulmonary circulation?  
A. The left side    **B. The right side**    C. The atria    D. The ventricles

25. In which type of blood vessels is the greatest loss in blood pressure seen?  
 A. Arteries                      **B. Arterioles**                      C. Capillaries                      D. Venules  
 E. Veins
26. During inhalation, the diaphragm \_\_\_\_\_. During exhalation, the diaphragm \_\_\_\_\_.  
 A. Contracts; contracts                      **B. Contracts; relaxes**  
 C. Relaxes, contracts                      D. Relaxes; relaxes
27. In the respiratory system, gas exchange take place in capillary beds surrounding the \_\_\_\_\_?  
 A. nasal passages                      B. branchiae                      **C. alveoli**  
 D. diaphragm                      E. lungs
28. How is the majority of the CO<sub>2</sub> transported back to the lungs?  
 A. Directly dissolved into the plasma                      **B. As HCO<sub>3</sub><sup>-</sup>**  
 C. Bound to the hemoglobin                      D. Bound to carbonic anhydrase  
 E. None of the above
29. Where is the partial pressure (concentration) of CO<sub>2</sub> the greatest?  
 A. In the air                      B. In the alveolar capillaries                      C. In the body capillaries  
**D. In the interstitial fluid**                      E. None of the above
30. Which organ has the greatest internal surface areas?  
 A. Mouth (buccal cavity)                      B. Stomach                      **C. Small intestine**  
 D. Large Intestine                      E. Rectum
31. Which of the following correctly traces blood flow from the heart, to the lungs, back to the heart, and then to the body  
 A. Vena cava - right ventricle - right atrium - pulmonary trunk - pulmonary arteries - lungs - pulmonary veins, left ventricle - left atrium - aorta  
**B. Vena cava - right atrium - right ventricle - pulmonary trunk - pulmonary arteries - lungs - pulmonary veins, left atrium - left ventricle - aorta**  
 C. Vena cava - right ventricle - right atrium - pulmonary trunk - pulmonary veins - lungs - pulmonary arteries, left ventricle - left atrium - aorta  
 D. Vena cava - right atrium - right ventricle - pulmonary trunk - pulmonary veins - lungs - pulmonary arteries, left atrium - left ventricle - aorta  
 E. None of the above
32. In which of the following organs does chemical digestion take place?  
 I. Mouth                      II. Stomach                      III. Small Intestine                      IV. Large Intestine  
 A. II only                      B. III only                      C. II, III                      **D. I, II, III**                      E. I, II, III, IV

33. Which of the following statements (A-D) about bile is FALSE? If statements A-D are true, then choose E.
- A. **The gall bladder produces and stores bile**
  - B. Bile is an amphipathic molecule
  - C. Bile emulsifies fats
  - D. The actions of bile make it easier for lipases to break down glycerides
  - E. All of the above statements about bile are TRUE
34. Which of the below blood vessels have valves to prevent backflow?
- A. Arteries
  - B. Arterioles
  - C. Capillaries
  - D. Venules
  - E. **Veins**
35. Which of the following cell types is NOT apart of the immune system?
- A. Mast cells
  - B. Macrophages
  - C. **Erythrocytes**
  - D. Neutrophils
  - E. All of the above are a part of the immune system
36. Which of the following is NOT true of the first line of defense
- A. The skin is dry
  - B. The skin has a low pH which
  - C. Mucous membranes secrete lysozymes which kill pathogens
  - D. There are colonies of harmless bacteria living on the skin which make it hard for pathogens to become established
  - E. **All of the above statements about the first line of defense are TRUE**
37. Which of the following cells listed below secretes chemicals to both stimulate production of macrophages and neutrophils as well as attract cells involved in the immune system to the affected area?
- A. **Mast cells**
  - B. Macrophages
  - C. Erythrocytes
  - D. Neutrophils
  - E. None of the above
38. Which of the following statements (A-D) about an cell-mediated immune response is FALSE? If statements A-D are true, then choose E.
- A. A macrophage engulfs a pathogen, becoming an antigen-presenting cell
  - B. The antigen-presenting cell activates a virgin or memory helper T cell
  - C. **The virgin or memory cytotoxic T Cell becomes activated by direct contact with the pathogen**
  - D. The activated helper T Cell further activates the cytotoxic T cell
  - E. All of the above statements about a cell-mediated immune response are TRUE
39. What is an antigen?
- A. **A protein found on the surface of a cell**
  - B. A protein which is directly involved in causing the inflammatory response
  - C. A protein floating in the blood which can bind to plasma membrane proteins
  - D. A protein used in cell to cell communication in leucocytes
  - E. None of the above

40. Which of the following statements (A-D) about an antibody-mediated immune response is FALSE? If statements A-D are true, then choose E.
- A. A macrophage engulfs a pathogen, becoming an antigen-presenting cell
  - B. The antigen-presenting cell activates a virgin or memory helper T cell
  - C. The virgin or memory B Cell becomes activated by direct contact with the pathogen
  - D. The activated helper T Cell further activates the B cell
  - E. All of the above statements about an antibody-mediated immune response are TRUE**
41. Why do a small portion of activated helper T cells, cytotoxic T cells, and B cells become memory cells?
- A. Memory cells prevent further pathogen attacks
  - B. Memory cells speed up the immune response should the body be infected with that particular pathogen again**
  - C. Memory cells speed up the immune response for all pathogens
  - D. Memory cells aid in protecting the nervous system from pathogens
  - E. None of the above
42. Which of the following is NOT a function of the excretory system?
- A. Production of salts**
  - B. Water conservation
  - C. Osmoregulation
  - D. Removal of nitrogenous wastes
  - E. Regulation of blood volume and concentration
43. Which of the following statements (A-D) about reabsorption in the Loop of Henle is FALSE? If statements A-D are true, then choose E.
- A. As the Loop of Henle permeates deeper into the medulla of the kidney, external salt concentrations increase
  - B. The walls of both the ascending and descending portions of the Loop of Henle are permeable to water**
  - C. Salts are actively transported out of the filtrate in the ascending portion of the Loop of Henle
  - D. The vasa recta surrounds the Loop of Henle and reabsorbs water and salts into the blood
  - E. All of the above statements about the Loop of Henle are TRUE.
44. If someone is dehydrated:
- A. The body releases aldosterone, making the walls of the collecting duct permeable to water
  - B. The body releases aldosterone, making the walls of the collecting duct impermeable to water
  - C. The body releases ADH, making the walls of the collecting duct permeable to water**
  - D. The body releases ADH, making the walls of the collecting duct impermeable to water
45. High blood pressure in the glomerulus forces plasma and small dissolved particles out of the capillary bed. This filtrate is captured by the Bowman's Capsule.
- A. True**
  - B. False

46. What is the function of an antagonist?
- A. It causes an immune response
  - B. It prevents an immune response
  - C. It binds to a cell receptor, initiating a response
  - D. It prevents other molecules from binding to a cell receptor, preventing the response**
  - E. None of the above
47. Which of the following statements (A-D) about hormones is FALSE? If statements A-D are true, then choose E.
- A. Most hormones are proteins or lipids
  - B. Most hormones act by binding to receptors on the target cells
  - C. The same hormone can have different effects on different cells
  - D. Endocrine actions trigger responses in cells far away from the signal-generating cell
  - E. All of the above statements about the endocrine system are TRUE**
48. Nerve firing (an action potential) is all or none
- A. True**
  - B. False
49. Which of the following statements (A-D) about a nerve firing (and action potential) is FALSE? If statements A-D are true, then choose E.
- A. A neuron at rest has a relative positive charge outside the plasma membrane and a relative negative charge inside the plasma membrane
  - B. When a nerve fires, gated Na<sup>+</sup> channels open, allowing Na<sup>+</sup> to rush in. This requires ATP energy to pump Na<sup>+</sup> into the cell**
  - C. The membrane potential is reestablished by the actions of the Na<sup>+</sup>/K<sup>+</sup> pump
  - D. The time it takes to reestablish the ion gradient is known as the refractory period. The nerve cannot fire during this time.
  - E. All of the above statements about nerve firing are TRUE
50. Myelinated neurons:
- A. Are relatively rare in the nervous system
  - B. Help speed up the rate of travel of an impulse down a cell**
  - C. Have Schwann cells associated with the cell body
  - D. Have no synapses
  - E. None of the above
51. What portion of the brain is responsible for integration of vision stimuli?
- A. Temporal lobe
  - B. Frontal lobe
  - C. Parietal lobe
  - D. Occipital lobe**
52. What happens at a synapse?
- A. Ions jump across from the one cell to another, allowing the impulse to continue
  - B. Neurotransmitters cross the synaptic cleft and bind to receptors, which opens Na<sup>+</sup> channels in the post-synaptic cell**
  - C. ATP is hydrolyzed in the post-synaptic cell, allowing K<sup>+</sup> to enter
  - D. Magic, it is just freakin' magic, man
  - E. None of the above