

**BIOS 100 - Summer 2007**  
**Exam III, 18 July, 2007**  
**Michael Muller, Instructor**

**Name:**

**TA:**

This exam consists of 54 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!

*The Optional Final Exam will be from 11:00 - 12:00 in **Lecture Center C3**, not in the current room. Do NOT forget this, or you'll be walking around lost and we'll laugh at you...*

Use the key below to answer questions 1-4

- I. Tracheids and Vessels
- II. Sclerenchyma
- III. Collenchyma
- IV. Companion cells and Sieve tube elements
- V. Parenchyma

1. Which of these cell types is the least developed cell type in a plant?  
A. I      B. II      C. III      D. IV      E. V
2. Which of these cells function in structural support of the plant?  
A. II      B. III      C. II & III      D. I, II, III      E. II, III, V
3. Which of the above cells are living at functional maturity?  
A. V      B. IV, V      C. III, IV, V      D. II, III, IV, V      E. I, II
4. Which of the above cells are primarily involved in transport of photosynthate (sucrose)?  
A. I      B. IV      C. V      D. I, IV      E. I, IV, V
5. What is the function of the endodermis?  
A. To protect the plant from pathogens and parasites  
B. To prevent insects and fungi from accessing the xylem and phloem  
C. Generation of branch roots  
D. Regulation of solute entry into the xylem  
E. None of the above
6. Which of the following statements (A-D) about plant growth is FALSE? If statements A-D are true, then choose E.  
A. The shoot apical meristem, the root apical meristem, and the axillary meristems are all examples of plant primary meristems  
B. The vascular cambium and the pericycle are examples of plant secondary meristems  
C. Primary meristems are responsible for growth which results in an increase in length  
D. Secondary meristems are responsible for growth which results in an increase in girth  
E. All of the above statements about plant growth are TRUE
7. A tree has leaves with a prominent midvein and flowers with five petals. This plant is a:  
A. Monocot      B. Dicot      C Pine tree

8. Leaf mesophyll is what type of leaf tissue?  
 A. Ground tissue                      B. Vascular tissue                      C. Dermal Tissue
9. Plants have \_\_\_\_\_ growth.  
 A. determinate                      B. indeterminate                      C. differential  
 D. indifferential                      E. None of the above

Use the key below to choose the best answer questions 10 - 15.

- I. Angiosperm (flowering plants)                      III. Coniferophyta (pine trees)  
 II. Bryophyta (mosses & liverworts)                      IV. Pteridophyta (ferns)

10. Which of the above plants contain vascular tissue?  
 A. I                      B. I, III                      C. I, III, IV                      D. I, II, III, IV
11. Which of the above plants produce pollen?  
 A. I                      B. I, III                      C. I, III, IV                      D. II, IV
12. Which of the above plants contain anthers?  
 A. I                      B. I, III                      C. I, III, IV                      D. II, IV
13. Which of the above plants produce spores?  
 A. I                      B. I, III                      C. I, III, IV                      D. II, IV
14. Which of the above plants has the gametophyte as the dominant stage in the life cycle?  
 A. I                      B. II                      C. III                      D. IV
15. Double fertilization occurs in this/these plants  
 A. I                      B. I, III                      C. I, III, IV                      D. II, IV
16. A seed is a ripened \_\_\_\_\_.  
 A. Egg sac    B. Ovule                      C. Ovary                      D. Pistil                      E. Pollen
17. Bird pollinate flowers are typically:  
 A. White    B. Blue                      C. Red                      D. Yellow                      E. Black
18. Which of the following statements (A-D) about angiosperms (flowering plants) is FALSE.  
 If statements A-D are true, then chose E.  
 A. Angiosperms have coevolved with animals by producing flowers which attract animals to their reproductive structures and tricking them to carrying pollen from flower to flower.  
 B. Angiosperms have coevolved with animals by producing fruits which attract animals. Animals eat the fruits and carry the seeds within their digestive tract, eventually depositing the seeds in feces  
 C. Some angiosperms have reverted back to wind pollination  
 D. During angiosperm double fertilization, one sperm fertilizes the egg while the other fertilizes the two polar nuclei  
 E. All of the above statements about angiosperms are TRUE

19. The \_\_\_\_\_ is the receptive site for pollen on a flower.  
 A. Stigma    B. Style    C. Ovary    D. Ovule    E. Anther
20. The greatest loss of blood pressure occurs in these vessels:  
 A. Arteries    B. Arterioles    C. Capillaries    D. Venules    E. Veins
21. Blood velocity is slowest in these vessels:  
 A. Arteries    B. Arterioles    C. Capillaries    D. Venules    E. Veins
22. These are large, thin-walled blood vessels possessing valves and return blood to the heart  
 A. Arteries    B. Arterioles    C. Capillaries    D. Venules    E. Veins
23. Which side of the heart is filled with oxygenated blood in an adult mammal?  
 A. The right side    B. The left side    C. The atria    D. The ventricles
24. During inhalation, the diaphragm \_\_\_\_\_ and air \_\_\_\_\_ flows into the lungs.  
 A. contracts; passively    B. contracts; actively  
 C. relaxes; passively    D. relaxes; actively
25. Where is the concentration of oxygen the least?  
 A. In the air    B. In the alveolar capillaries    C. In the body capillary beds  
 D. In the tissues    E. In the right atrium
26. How is the majority of the CO<sub>2</sub> transported in the blood?  
 A. Directly dissolved in the plasma    B. Bound to the hemoglobin  
 C. As H<sub>2</sub>CO<sub>3</sub>    D. As HCO<sub>3</sub><sup>-</sup>
27. Which of the below molecules has the greatest affinity for oxygen gas?  
 A. Myoglobin    B. Llama hemoglobin  
 C. Fetal hemoglobin    D. Maternal (adult) hemoglobin
28. How does a fungus digest food?  
 A. It is an external feeder, so it excretes enzymes and absorbs the chemically digested molecules  
 B. It is substrate feeder, so they must eat their substratum  
 C. It is a fluid feeder so it can only consume liquid food sources  
 D. Fungi are internal feeders so they possess a digestive system like we do  
 E. Fungi are filter feeders
29. Which organ is incorrectly matched with one of its functions:  
 A. Mouth – chemical and mechanical digestion  
 B. Stomach – secretes acids to kill bacteria  
 C. Liver – production of bile  
 D. Pancreas – production of many digestive enzymes  
 E. Large Intestine – primary site of absorption of digested food molecules

30. Which of the organs below has the greatest internal surface area?  
 A. Mouth    B. Stomach    C. Small intestine    D. Large intestine    E. Rectum
31. Why is mucus secreted in the stomach?  
 A. To kill off bacteria  
 B. To protect the stomach lining from being damaged by stomach acid  
 C. To lubricate the food, making it easier to move through the digestive tract  
 D. To activate stomach digestive enzymes  
 E. None of the above
32. The circulatory system directly aids in the function of all of the below systems except:  
 A. Respiratory system    B. Immune system    C. Endocrine system  
 D. Nervous System    E. Digestive system
33. Why does consumption of Olestra® lead to such unpleasant side effects as fecal urgency and diarrhea?  
 A. Olestra® irritates the lining of the small and large intestine  
 B. The undigested fats essentially lubricated one's intestines, making it difficult to control bowel movements  
 C. Many people had an allergic reaction to the compounds in Olestra®, causing the body to purge foodstuff made with the fat substitute  
 D. Olestra® was originally developed as a laxative, so these side effects are to be expected  
 E. None of the above
34. Which line of defense is most effective in keeping the body free of pathogens? (i.e. this line of defense keep out over 99% of all pathogens)  
 A. The first line of defense (skin and mucous membranes)  
 B. The second line of defense (phagocytes, macrophages, etc)  
 C. The third line of defense (B-Cells, Cytotoxic T-Cells, etc)  
 D. None of the above
35. Which of the following statements (A-D) about the skin and mucous membranes is FALSE. If statements A-D are true, then chose E.  
 A. The skin is typically a very dry environment  
 B. Populations of harmless bacteria reside on the skin, making it hard for pathogens to become established  
 C. The skin has a low pH  
 D. Mucous membranes are sticky which traps bacteria and secrete lysozymes that break down bacteria  
 E. All of the above statements about the skin and mucous membranes are TRUE.
36. Antibodies are produced by:  
 A. Macrophages    B. Effector Helper T-Cells  
 C. Effector Cytotoxic T-Cells    D. Effector B-Cells  
 E. Pathogens

37. Which of the below cells can become antigen presenting cells (APC)?
- A. Macrophages
  - B. Mast Cells
  - C. Eosinophils
  - D. Neutrophils
  - E. Basophils
38. Which cell type is incorrectly matched with its function?
- A. Antigen Presenting Cells - Inform B lymphocytes that a specific antigen is present
  - B. Helper T cells - produce and secrete chemicals which activate virgin or memory cytotoxic T-cells and B-cells
  - C. Cytotoxic T cells - T lymphocytes that eliminate specific pathogens
  - D. Macrophage - phagocyte which consumes pathogens
  - E. All of the above are correctly matched with their function
39. An effector Cytotoxic T-Cell can recognize (and kill) cells infected with the cowpox virus. It encounters some pathogenic *E. coli*. What will it do in response to this *E. coli*?
- A. Kill the pathogenic *E. coli*
  - B. Produce antibodies to bind to the *E. coli*
  - C. Secrete chemicals to inform the macrophages of the pathogen infestation
  - D. Nothing, it ignores the *E. coli* while looking for cells infected w/ the cowpox virus
  - E. None of the above
40. When the body is dehydrated:
- A. Aldosterone is secreted, causing the walls of the collecting duct to become permeable to water
  - B. Aldosterone is secreted, causing the walls of the collecting duct to become impermeable to water
  - C. ADH is secreted, causing the walls of the collecting duct to become permeable to water
  - D. ADH is secreted, causing the walls of the collecting duct to become impermeable to water
  - E. None of the above
41. What happens in the glomerulus?
- A. Much of the plasma is filtered out of the blood and captured by the Bowman's Capsule
  - B. The plasma is actively transported out of the glomerular capillary beds
  - C. The filtrate is reabsorbed by the glomerular capillaries
  - D.  $\text{Na}^+$ ,  $\text{H}^+$ , and other ions are pumped from the filtrate into the glomerular capillaries
  - E. None of the above
42. Which of the following statements (A-D) about the nephron is FALSE?
- A. The descending portion of the Loop of Henle is permeable to water
  - B. Water is actively transported out of the filtrate by aquaporins
  - C. The walls of the ascending portion of the Loop of Henle are impermeable to water
  - D.  $\text{Na}^+$  and  $\text{Cl}^-$  are actively transported across the membrane of the ascending portion of the Loop of Henle to maintain the solute gradient and to be reabsorbed into the blood

43. How does reabsorption of glucose, vitamins, and ions occur in the proximal tubule?
- Glucose, vitamins, and ions are actively transported into the epithelial cells of the proximal tubule
  - Glucose, vitamins, and ions diffuse across the plasma membrane of the epithelial cells of the proximal tubule
  - The  $\text{Na}^+/\text{K}^+$  pump creates a low concentration of  $\text{Na}^+$  in the epithelial cells, which drives the entry of glucose, vitamins, and ions through  $\text{Na}^+$  facilitated diffusion symports
  - Hormones regulate the permeability of the proximal tubule epithelial membranes
  - There is no reabsorption of glucose, vitamins, and ion in the proximal tubule
44. What is an hormone antagonist?
- A molecule which generates a cellular response opposite to a given hormone
  - A molecule which prevents the secretion of a given hormone
  - A molecule which blocks the binding of a given hormone to its receptor
  - A molecule which allosterically modifies a given hormone
45. Which of the following statements (A-D) about the hormone activity is FALSE? If statements A-D are true, then choose E.
- Hormones are typically dispersed throughout the body via the circulatory system
  - A given hormone will have the same effect in all target cells.
  - Protein hormones must bind to a receptor to generate an effect
  - Some cellular responses require two or more hormones to generate the response
  - All of the above statements are TRUE
46. A neuron at rest:
- Is electrically neutral
  - Is positive on the inside relative to the outside
  - Is negative on the inside relative to the outside
  - Can be either positive or negative on the inside relative to the outside
47. What is the function of a Schwann cell?
- To produce neurotransmitters
  - To aid in neuron axon growth
  - To aid in  $\text{Na}^+$  reabsorption
  - To aid in neuron reproduction
  - To produce myelin sheath around the axon of the neuron
48. When a nerve fires:
- $\text{Na}^+/\text{K}^+$  pumps turn on, allowing  $\text{Na}^+$  to be pumped into the neruon
  - $\text{Na}^+/\text{K}^+$  pumps turn on, allowing  $\text{Na}^+$  to be pumped out of the neruon
  - Gated  $\text{Na}^+$  channels open up, allowing  $\text{Na}^+$  to rush into the neuron
  - Gated  $\text{Na}^+$  channels open up, allowing  $\text{Na}^+$  to rush out of the neuron
  - None of the above
49. Which of the following areas of the brain is responsible for maintaining homeostasis in the body?
- The thalamus
  - The hypothalamus
  - The cerebellum
  - The medulla
  - The pons

50. Which lobe of the brain is most important in the reception of visual stimuli?  
A. The frontal lobe                      B. The parietal lobe                      C. The temporal lobe  
D. The occipital lobe                      E. None of the above
51. Which of the following statements about neurons are false? (Hey, I took pity on you, one of them actually IS false... :)  
A. The typical 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. Myelinated neurons have Schwann cells associated with them.  
D. A synapse is the junction between a neuron and another cell  
E. Many neurons have different intensities of depolarization depending upon the strength of the stimuli
52. The primary function of the cerebellum is in regulating:  
A. Motor control                      B. Speech                      C. Heartbeat  
D. Digestion                      E. None of the above
53. How does a macrophage determine whether a cell is a self cell or a non-self cell?  
A. By the hormones the cell in question secretes  
B. By the cell in question's ability to bind to hormones secreted by the macrophage  
C. By the ability of the cell in question to produce to antibodies  
D. By the pattern and types of antigens present on the cell in question  
E. None of the above
54. The final exam is located (hint: read the first page)  
A. Here in Lecture Center F4                      B. In Lecture Center C3