

# Biology 112

## Exam 2 Questions

### Chapter 3

1. List and describe the 3 basic parts of a cell.
2. Identify the major components that make up the plasma membrane.
3. Define with respect to the plasma membrane: semipermeable; selectively permeable.
4. Give the basic function of the following plasma membrane proteins: carrier protein; channel protein; receptor protein; enzymatic protein; cell recognition protein.
5. Define: cytosol; cytoplasm; organelle.
6. Give the basic function of the following organelles: rough endoplasmic reticulum; smooth endoplasmic reticulum; Golgi apparatus; vacuoles.
7. Give the basic function of the following organelles: ribosomes; lysosomes; peroxisomes.
8. Identify the 3 major protein components of the cytoskeleton. What is the function of the cytoskeleton?
9. Give the basic function of the following organelles: centrioles; cilia; flagella.
10. Which cellular organelles are composed primarily of microtubules?
11. Identify the basic function of the following: nucleus; nuclear envelope; nucleolus.
12. What is stored in the nucleus of the cell? In what structural form is it stored?
13. Define: passive transport; diffusion. How does facilitated diffusion differ from simple diffusion?
14. Define the following types of solutions with respect to a cell: isotonic; hypotonic; hypertonic.
15. What will be the result of a cell being placed in the following solution types: isotonic; hypotonic; hypertonic?
16. Define: osmosis; filtration. Where in the body would filtration commonly occur?
17. Define: active transport. List 2 ways active transport differs from passive transport.
18. Define: endocytosis; exocytosis. Are these active processes?
19. List & distinguish among the 3 forms of endocytosis.
20. Identify the 3 stages of interphase of the cell cycle. What is the major event occurring during each stage.
21. Define: mitosis; cytokinesis; homologous chromosomes.
22. Identify the 4 stages of mitosis & the major events occurring during each stage.
23. Define: stem cells; progenitor cells; differentiation.
24. Define apoptosis. Give an example of apoptosis: during development; following tissue injury.

### Chapter 4

25. Define: metabolism; anabolism; catabolism. Give an example of each.
26. Define: dehydration synthesis; hydrolysis. Give an example of each.
27. What is the function of an enzyme? How do enzymes achieve this function?
28. Define: catalyst; substrate; cofactor; coenzyme.
29. What is the major component of most enzymes (what are enzymes mostly made of)? Where does an enzyme interact with its substrate?

30. Sketch a metabolic pathway. What assists (speeds up) each step of the pathway?  
How can this pathway be inhibited?
31. Define energy. List 4 types of energy used by cells.
32. What is the major energy source used for most chemical reactions? What form of energy does it supply? Where is the energy stored in this energy form?
33. Define: oxidation; cellular respiration. What are the 3 major steps in cellular respiration?
34. What molecule is broken down through glycolysis? What are the major products of glycolysis?
35. What is the maximum energy yield from complete aerobic respiration of one glucose molecule? What other products are produced?
36. Where in a human cell does aerobic respiration primarily occur? Why is oxygen required?
37. Define: gene; genome.
38. Define: DNA replication; transcription; translation.
39. For each of the following, identify the substrate & where in the cell it occurs: DNA replication; transcription; translation.
40. Identify the function of the following in DNA replication: DNA helicase; DNA polymerase. Why is replication said to be semiconservative?
41. Given a DNA sequence, be able to give the corresponding mRNA sequence produced by transcription.
42. Identify the function of the following in translation: mRNA; rRNA; tRNA.
43. Define: codon; start codon; stop codon. Given an mRNA molecule length, be able to give the corresponding polypeptide length.

## **Chapter 5**

44. Identify 5 major characteristics shared by all epithelial tissues. What is a basement membrane?
45. List 5 major functions of epithelial tissue.
46. Identify the general structure (cell types), location & function for the following epithelial tissues: simple squamous epithelial tissue; simple cuboidal epithelial tissue; simple columnar epithelial tissue; pseudostratified columnar epithelial tissue.
47. Identify the general structure (cell types), location & function for the following epithelial tissues: stratified squamous epithelial tissue; stratified cuboidal epithelial tissue; stratified columnar epithelial tissue; transitional epithelial tissue.
48. Define: gland; endocrine; exocrine gland.
49. Define: merocrine gland; apocrine gland; holocrine gland.
50. Identify the product secreted by each of the following: serous cells; mucous cells; goblet cells.
51. Identify the major characteristics of connective tissues. What is extracellular matrix?
52. Identify the major function of the following connective tissue cells: fibroblasts; macrophages; mast cells.
53. Identify the relative strength & major function of the following connective tissue fibers: collagen fibers; elastic fibers; reticular fibers.

54. Identify the general structure (cell types and fibers), location & function for the following connective tissues: loose connective tissue; adipose connective tissue; dense connective tissue.
55. Identify the general structure (cell types and fibers), location & function for the following connective tissues: hyaline cartilage; elastic cartilage; fibrocartilage.
56. Identify the general structure (cell types and fibers), location & function for the following connective tissues: bone; blood.
57. Identify the general structure, location & function for the following muscle tissues: smooth muscle; skeletal muscle; cardiac muscle.
58. For each of the above muscle types, indicate any unique features & whether it is under voluntary or involuntary control.
59. Identify the location & general function of nervous tissue. What cell types are found within nervous tissue?
60. Briefly describe & indicate where you might find each of the following membranes in the body: serous membrane; mucous membrane; cutaneous membrane; synovial membrane.