Multiple-Choice Questions

1) The four main types of tissues include
A) epithelium.
B) muscle.
C) nerve.
D) connective.
E) all of the above
Answer: E
Diff: 1
Learning Outcome: 4-1
Skill Level: 1 Reviewing Facts and Terms

2) Collections of specialized cells and cell products that perform a specific function are
A) cellular aggregates.
B) tissues.
C) organs.
D) organ systems.
E) cellular strata.
Answer: B
Diff: 1
Learning Outcome: 4-1
Skill Level: 1 Reviewing Facts and Terms

3) The most abundant tissue type in the body is
A) epithelial tissue.
B) connective tissue.
C) muscle tissue.
D) nervous tissue.
E) contractile tissue.
Answer: B
Diff: 1
Learning Outcome: 4-1
Skill Level: 1 Reviewing Facts and Terms
4) Intercellular connections that lock cells together are called
A) tight junctions.
B) gap junctions.
C) desmosomes.
D) CAMS.
E) none of the above
Answer: C
Diff: 1
Learning Outcome: 4-2
Skill Level: 1 Reviewing Facts and Terms

5) Epithelial cells are adapted for
A) providing protection.
B) controlling permeability.
C) providing sensations.
D) producing secretions.
E) all of the above
Answer: E
Diff: 1
Learning Outcome: 4-2
Skill Level: 1 Reviewing Facts and Terms

6) Epithelial cells that are adapted for removing material from the surface usually have ________ at their free surface.
A) many mitochondria
B) cilia
C) microvilli
D) Golgi complexes
E) junctional complexes
Answer: B
Diff: 1
Learning Outcome: 4-2
Skill Level: 1 Reviewing Facts and Terms

7) A type of intercellular connection in which the outermost lipid portions of the two cell membranes is fused is termed a(n)
A) tight junction.
B) gap junction.
C) intermediate junction.
D) desmosome.
E) none of the above
Answer: A
Diff: 1
Learning Outcome: 4-2
Skill Level: 1 Reviewing Facts and Terms
8) Dead skin cells are shed in thick sheets because the strong links are held together by
A) gap junctions.
B) intermediate junctions.
C) tight junctions.
D) desmosomes.
E) junctional complexes.
Answer: D
Diff: 1
Learning Outcome: 4-2
Skill Level: 1 Reviewing Facts and Terms

9) Which of the following is a term used to describe the number of layers of cells?
A) stratified
B) squamous
C) cuboid al
D) columnar
E) All of the above are correct.
Answer: A
Diff: 1
Learning Outcome: 4-2
Skill Level: 1 Reviewing Facts and Terms

10) Examination of a tubular structure with the electron microscope reveals a lining of cells with microvilli. This tissue is from the
A) stomach.
B) small intestine.
C) female reproductive system.
D) male reproductive system.
E) urinary bladder.
Answer: B
Diff: 1
Learning Outcome: 4-2
Skill Level: 3 Critical Thinking & Clinical Applications

11) The type of epithelium that is found in functional lung tissue is
A) simple squamous.
B) stratified squamous.
C) simple cuboidal.
D) stratified cuboidal.
E) transitional.
Answer: A
Diff: 1
Learning Outcome: 4-3
Skill Level: 1 Reviewing Facts and Terms
12) Which of the following is a correct statement about stratified epithelia?
A) They afford little mechanical protection.
B) They are characteristic of regions where secretion or absorption occurs.
C) They line internal compartments and passageways.
D) They cover surfaces subjected to mechanical or chemical stress.
E) They are vascular.
Answer: D
Diff: 1
Learning Outcome: 4-3
Skill Level: 1 Reviewing Facts and Terms

13) The type of epithelium found lining the respiratory tract is
A) simple squamous.
B) simple cuboidal.
C) stratified squamous.
D) transitional.
E) pseudostratified columnar.
Answer: E
Diff: 1
Learning Outcome: 4-3
Skill Level: 1 Reviewing Facts and Terms

14) Simple squamous epithelium would be found
A) at the surface of the skin.
B) lining the trachea.
C) lining blood vessels.
D) lining the chambers of the thyroid gland.
E) lining the urinary bladder.
Answer: C
Diff: 1
Learning Outcome: 4-3
Skill Level: 1 Reviewing Facts and Terms

15) A simple cuboidal epithelium would be found
A) lining the urinary bladder.
B) lining the ducts that drain sweat glands.
C) lining kidney tubules.
D) lining the stomach.
E) at the surface of the skin.
Answer: C
Diff: 1
Learning Outcome: 4-3
Skill Level: 1 Reviewing Facts and Terms
16) The type of epithelium with multiple cell types whose nuclei are staggered is
A) pseudostratified columnar epithelium.
B) simple columnar epithelium.
C) simple cuboidal epithelium.
D) stratified columnar epithelium.
E) stratified cuboidal epithelium.
Answer: A
Diff: 1
Learning Outcome: 4-3
Skill Level: 1 Reviewing Facts and Terms

17) The linings of sweat glands have this type of tissue.
A) simple squamous
B) stratified squamous
C) transitional epithelium
D) pseudostratified columnar epithelium
E) simple cuboidal
Answer: E
Diff: 1
Learning Outcome: 4-3
Skill Level: 1 Reviewing Facts and Terms

18) Which of the following is a type of secretion in which cells undergo mitosis and rupture?
A) holocrine
B) merocrine
C) apocrine
D) mucous
E) none of the above
Answer: A
Diff: 1
Learning Outcome: 4-3
Skill Level: 1 Reviewing Facts and Terms

19) Which of the following cells is found in stratified squamous epithelial tissue?
A) adipocyte
B) mast cell
C) fibroblast
D) melanocyte
E) macrophage
Answer: D
Diff: 1
Learning Outcome: 4-3
Skill Level: 1 Reviewing Facts and Terms
20) Milk production is an example of what type of secretion?
A) merocrine
B) holocrine
C) apocrine
D) serous
E) endocrine
Answer: C
Diff: 1
Learning Outcome: 4-3
Skill Level: 1 Reviewing Facts and Terms

21) Most of the digestive tract is lined by
A) stratified squamous epithelia.
B) columnar epithelia.
C) transitional epithelia.
D) simple squamous epithelia.
E) transitional epithelia.
Answer: B
Diff: 1
Learning Outcome: 4-3
Skill Level: 1 Reviewing Facts and Terms

22) Which of the following protects all of the others?
A) cartilage
B) bone
C) muscle
D) nerves
E) skin
Answer: E
Diff: 2
Learning Outcome: 4-3
Skill Level: 2 Reviewing Concepts

23) Which of the following is a type of connective tissue?
A) muscle tissue
B) nervous tissue
C) bone tissue
D) simple squamous tissue
E) glandular tissue
Answer: C
Diff: 1
Learning Outcome: 4-4
Skill Level: 1 Reviewing Facts and Terms
24) A lymph node contains large amounts of
   A) basement membrane.
   B) junctional complexes.
   C) intercellular glue.
   D) fibrous netting.
   E) reticular fibers.
   Answer: E  
   Diff: 1  
   Learning Outcome: 4-4  
   Skill Level: 1 Reviewing Facts and Terms

25) Functions of connective tissue include
   A) establishing a structural framework for the body.
   B) transporting fluids and dissolved materials.
   C) providing protection for delicate organs.
   D) storing energy reserves.
   E) all of the above
   Answer: E  
   Diff: 1  
   Learning Outcome: 4-4  
   Skill Level: 1 Reviewing Facts and Terms

26) Most cells of the hypodermis are
   A) fibroblasts.
   B) macrophages.
   C) adipocytes.
   D) mast cells.
   E) melanocytes.
   Answer: C  
   Diff: 1  
   Learning Outcome: 4-4  
   Skill Level: 2 Reviewing Concepts

27) The fiber type that can be stretched is called
   A) collagen.
   B) elastin.
   C) actin.
   D) myosin.
   E) fibrin.
   Answer: B  
   Diff: 1  
   Learning Outcome: 4-4  
   Skill Level: 1 Reviewing Facts and Terms
28) The cell that accounts for the least amount of the volume of blood is the
A) red blood cell.
B) leukocyte.
C) platelet.
D) thrombocyte.
E) none of the above
Answer: B
Diff: 1
Learning Outcome: 4-4
Skill Level: 1 Reviewing Facts and Terms

29) Chondrocytes are to cartilage as adipocytes are to
A) blood.
B) fat.
C) epithelium.
D) bone.
E) nervous tissue.
Answer: B
Diff: 1
Learning Outcome: 4-4
Skill Level: 1 Reviewing Facts and Terms

30) The most common type of cartilage is
A) ligamentous.
B) hyaline.
C) elastic.
D) fibrous cartilage.
E) osseous.
Answer: B
Diff: 1
Learning Outcome: 4-4
Skill Level: 1 Reviewing Facts and Terms

31) Cells that release histamine and heparin are
A) fibroblasts.
B) adipocytes.
C) melanocytes.
D) macrophages.
E) mast cells.
Answer: E
Diff: 1
Learning Outcome: 4-4
Skill Level: 1 Reviewing Facts and Terms
32) The immune surveillance of connective tissue is provided by
A) fibroblasts.
B) adipocytes.
C) macrophages.
D) osteocytes.
E) melanocytes.
Answer: C
Diff: 1
Learning Outcome: 4-4
Skill Level: 1 Reviewing Facts and Terms

33) Which of the following is the strongest type of cartilage?
A) fibrous cartilage.
B) hyaline cartilage.
C) elastic cartilage.
D) reticular cartilage.
E) transitional cartilage.
Answer: A
Diff: 1
Learning Outcome: 4-4
Skill Level: 1 Reviewing Facts and Terms

34) Types of connective tissue include
A) skeletal, smooth, and fibrous.
B) simple squamous, adipose, and smooth.
C) skeletal, smooth, and cardiac.
D) bone, elastic connective, and blood.
E) fibrous connective, stratified squamous, and skeletal.
Answer: D
Diff: 1
Learning Outcome: 4-4
Skill Level: 1 Reviewing Facts and Terms

35) Connective tissue structures that attach muscles to bone are called
A) organs.
B) tendons.
C) ligaments.
D) cartilage.
E) nerves.
Answer: B
Diff: 1
Learning Outcome: 4-4
Skill Level: 1 Reviewing Facts and Terms
36) Examples of fibrous connective tissue include
A) tendons.
B) salivary glands.
C) respiratory passages.
D) ligaments.
E) A and D only
Answer: E
Diff: 1
Learning Outcome: 4-4
Skill Level: 1 Reviewing Facts and Terms

37) Which of the following are supportive connective tissues?
A) cartilage
B) bone
C) adipose connective tissue
D) dense connective tissue
E) both A and B
Answer: E
Diff: 1
Learning Outcome: 4-4
Skill Level: 1 Reviewing Facts and Terms

38) This type of tissue typically makes up the internal framework of organs such as the spleen.
A) neural
B) cardiac
C) skeletal
D) serous
E) reticular
Answer: E
Diff: 1
Learning Outcome: 4-4
Skill Level: 1 Reviewing Facts and Terms

39) Skeletal muscle is to muscle tissue as bone is to
A) connective tissue.
B) muscle tissue.
C) nervous tissue.
D) epithelial tissue.
E) bone tissue.
Answer: A
Diff: 1
Learning Outcome: 4-4
Skill Level: 1 Reviewing Facts and Terms
40) Why does damaged cartilage heal slowly?
A) Chondrocytes cannot be replaced if killed, and other cell types must take their place.
B) Cartilage is avascular, so nutrients and other molecules must diffuse to the site of injury.
C) Damaged cartilage becomes calcified, thus blocking the movement of materials required for healing.
D) Chondrocytes divide more slowly than other cell types, delaying the healing process.
E) Damaged collagen cannot be quickly replaced, thus slowing the healing process.
Answer: B
Diff: 1
Learning Outcome: 4-4
Skill Level: 2 Reviewing Concepts

41) Examination of a tissue sample reveals relatively few cells with a large amount of intercellular material. The tissue is most likely
A) muscle.
B) nervous.
C) epithelium.
D) connective tissue.
E) adipose tissue.
Answer: D
Diff: 1
Learning Outcome: 4-4
Skill Level: 2 Reviewing Concepts

42) Which of the following is made up of a complete simple columnar epithelium and a relatively large amount of underlying connective tissue, and provides lubrication?
A) mucous membranes
B) serous membranes
C) cutaneous membranes
D) synovial membranes
E) none of the above
Answer: A
Diff: 1
Learning Outcome: 4-5
Skill Level: 1 Reviewing Facts and Terms

43) The skin is sometimes referred to as the
A) cutaneous membrane.
B) mucous membrane.
C) serous membrane.
D) synovial membrane.
E) none of the above
Answer: A
Diff: 1
Learning Outcome: 4-5
Skill Level: 1 Reviewing Facts and Terms
44) A lubricating membrane that works with cartilage in a joint is called a
   A) mucous membrane.
   B) synovial membrane.
   C) serous membrane.
   D) glandular membrane.
   E) cutaneous membrane.
   Answer:  B
   Diff:  1
   Learning Outcome:  4-5
   Skill Level:  1 Reviewing Facts and Terms

45) The serous membrane lining the abdominal cavity is the
   A) pleura.
   B) peritoneum.
   C) pericardium.
   D) perichondrium.
   E) periosteum.
   Answer:  B
   Diff:  1
   Learning Outcome:  4-5
   Skill Level:  1 Reviewing Facts and Terms

46) Tissue that is specialized for contraction is
   A) cartilage.
   B) nerve tissue.
   C) epithelium.
   D) connective tissue.
   E) muscle.
   Answer:  E
   Diff:  1
   Learning Outcome:  4-6
   Skill Level:  1 Reviewing Facts and Terms

47) The muscle tissue without striations is
   A) skeletal muscle.
   B) smooth muscle.
   C) cardiac muscle.
   D) voluntary muscle.
   E) multinucleated muscle.
   Answer:  B
   Diff:  1
   Learning Outcome:  4-6
   Skill Level:  1 Reviewing Facts and Terms
48) The muscle tissue that contains intercalated discs is
A) skeletal muscle.
B) smooth muscle.
C) cardiac muscle.
D) voluntary muscle.
E) multinucleate muscle.
Answer: C
Diff: 1
Learning Outcome: 4-6
Skill Level: 1 Reviewing Facts and Terms

49) The muscle tissue that usually attaches to bone is
A) skeletal muscle.
B) smooth muscle.
C) cardiac muscle.
D) voluntary muscle.
E) multinucleate muscle.
Answer: A
Diff: 1
Learning Outcome: 4-6
Skill Level: 1 Reviewing Facts and Terms

50) Tissue that contains large amounts of actin and myosin is
A) muscle tissue.
B) nervous tissue.
C) areolar tissue.
D) osseous tissue.
E) epithelial tissue.
Answer: A
Diff: 1
Learning Outcome: 4-6
Skill Level: 2 Reviewing Concepts

51) Smooth muscle differs from the other two types of muscle tissue because
A) of its arrangement of actin and myosin.
B) it has only one nucleus per cell.
C) it has the ability to contract independent of neural stimulation.
D) it contains actin and myosin filaments.
E) it forms muscle fibers.
Answer: A
Diff: 1
Learning Outcome: 4-6
Skill Level: 2 Reviewing Concepts
52) Another term for smooth muscle tissue is
A) nonstriated involuntary.
B) smooth voluntary.
C) striated voluntary.
D) smooth.
E) cardiac.
Answer: A
Diff: 1
Learning Outcome: 4-6
Skill Level: 2 Reviewing Concepts

53) Close examination of an organ reveals two middle tissue layers of organized cells. The layers seem to be running in circular and longitudinal directions. This tissue is probably
A) epithelium.
B) muscle.
C) nervous.
D) connective tissue.
E) fat tissue.
Answer: B
Diff: 1
Learning Outcome: 4-6
Skill Level: 3 Critical Thinking & Clinical Applications

54) The cell body of a neuron is also called
A) a soma.
B) dendrites.
C) an axon.
D) nerve fibers.
E) a synapse.
Answer: A
Diff: 1
Learning Outcome: 4-7
Skill Level: 1 Reviewing Facts and Terms

55) Which type of tissue contains neuroglial cells?
A) connective
B) epithelial
C) muscle
D) nerve
E) squamous
Answer: D
Diff: 1
Learning Outcome: 4-7
Skill Level: 1 Reviewing Facts and Terms
56) Cells of neural tissue that support the tissue are called  
A) neuroglia.  
B) neurons.  
C) fibroblasts.  
D) adipocytes.  
E) none of the above  
Answer: A  
Diff: 1  
Learning Outcome: 4-7  
Skill Level: 1 Reviewing Facts and Terms

57) Which of the following may result due to a decrease in tissue repair?  
A) invasion  
B) neoplasm  
C) infection  
D) cancer  
E) none of the above  
Answer: D  
Diff: 1  
Learning Outcome: 4-8  
Skill Level: 1 Reviewing Facts and Terms

58) The process of normal tissue repair is called  
A) necrosis.  
B) fibrosis.  
C) inflammation.  
D) regeneration.  
E) none of the above  
Answer: D  
Diff: 1  
Learning Outcome: 4-8  
Skill Level: 1 Reviewing Facts and Terms

59) The replacement of normal tissue with abnormal tissue is called  
A) redness, warmth, and swelling.  
B) bleeding, clotting, and hemolysis.  
C) necrosis, fibrosis, and scarring.  
D) hematoma, shivering, and fever.  
E) none of the above  
Answer: C  
Diff: 2  
Learning Outcome: 4-8  
Skill Level: 1 Reviewing Facts and Terms
60) Which of the following may occur with aging?
A) more efficient tissue maintenance  
B) increased ability to repair and more fragile connective tissue  
C) thicker connective tissue  
D) A and B only  
E) none of the above  
Answer: C  
Diff: 1  
Learning Outcome: 4-9  
Skill Level: 1 Reviewing Facts and Terms

61) Tissue changes with age can be the result of  
A) hormonal changes.  
B) changes in lifestyle.  
C) improper nutrition.  
D) inadequate levels of activity.  
E) all of the above  
Answer: E  
Diff: 1  
Learning Outcome: 4-9  
Skill Level: 1 Reviewing Facts and Terms

62) Approximately 75 percent of cancers in the aging population are the result of  
A) inadequate diets.  
B) chemical exposures.  
C) environmental factors.  
D) both A and B  
E) both B and C  
Answer: E  
Diff: 1  
Learning Outcome: 4-9  
Skill Level: 1 Reviewing Facts and Terms

Fill in the Blank Questions

1) The study of tissue is called __________________________.  
Answer: histology  
Diff: 1  
Learning Outcome: 4-1  
Skill Level: 1 Reviewing Facts and Terms

2) Flattened cells on the surface are characteristic of __________________________ epithelia.  
Answer: squamous  
Diff: 1  
Learning Outcome: 4-2  
Skill Level: 1 Reviewing Facts and Terms
3) The study of epithelial cells shed and collected at the epithelial surface is__________________________ cytology.
Answer: exfoliative
Diff: 1
Learning Outcome: 4-2
Skill Level: 1 Reviewing Facts and Terms

4) Secretions onto body surfaces require connection to the surface by a__________________________.
Answer: duct
Diff: 1
Learning Outcome: 4-3
Skill Level: 1 Reviewing Facts and Terms

5) Secretions directly into the blood are characteristic of__________________________ glands.
Answer: endocrine
Diff: 1
Learning Outcome: 4-3
Skill Level: 1 Reviewing Facts and Terms

6) Stringy proteins found in connective tissues are called__________________________.
Answer: fibers
Diff: 1
Learning Outcome: 4-4
Skill Level: 1 Reviewing Facts and Terms

7) The combination of fibers and ground substance in supporting connective tissues is known as__________________________
Answer: matrix
Diff: 1
Learning Outcome: 4-4
Skill Level: 1 Reviewing Facts and Terms

8) The most abundant fluid connective tissue in the body is__________________________.
Answer: blood
Diff: 1
Learning Outcome: 4-4
Skill Level: 1 Reviewing Facts and Terms

9) Epithelial and connective tissues combine to form__________________________ and tissues in the body.
Answer: membranes
Diff: 1
Learning Outcome: 4-5
Skill Level: 1 Reviewing Facts and Terms
10) Membranes that are mostly connective tissue with a discontinuous epithelium are called _______________________.
Answer: synovial membranes
Diff: 1
Learning Outcome: 4-5
Skill Level: 1 Reviewing Facts and Terms

11) ________________________ membranes are associated with freely moveable joints.
Answer: Synovial
Diff: 1
Learning Outcome: 4-5
Skill Level: 1 Reviewing Facts and Terms

12) ________________________ cells are modified to change shape in response to electrical stimuli.
Answer: Muscle
Diff: 1
Learning Outcome: 4-6
Skill Level: 1 Reviewing Facts and Terms

13) The type of muscle cell that has the ability to divide is ________________________ muscle.
Answer: smooth
Diff: 1
Learning Outcome: 4-6
Skill Level: 1 Reviewing Facts and Terms

14) Regions where adjacent cardiocytes interlock and electrical coupling between cells occurs are ________________________.
Answer: intercalated disks
Diff: 1
Learning Outcome: 4-6
Skill Level: 1 Reviewing Facts and Terms

15) ________________________ are cells that support and protect the neurons.
Answer: Neuroglia (Glia)
Diff: 1
Learning Outcome: 4-7
Skill Level: 1 Reviewing Facts and Terms

16) Histamine release during inflammation causes ________________________ blood vessel permeability.
Answer: increased
Diff: 1
Learning Outcome: 4-8
Skill Level: 1 Reviewing Facts and Terms
17) The process of tissue replacement is called _________________________.
Answer: regeneration
Learning Outcome: 4-8
Skill Level: 1 Reviewing Facts and Terms

Essay Questions

1) What type of epithelium would you expect to find lining the urinary bladder?
Answer: Since the urinary bladder changes size as a result of repetitive filling and emptying, one would expect it to be lining by a transitional epithelium. Transitional epithelia can withstand stretching much better than other types of epithelia.
Diff: 1
Learning Outcome: 4-3
Skill Level: 2 Reviewing Concepts

2) During a lab practical, a student examines a tissue that is composed of densely packed simple cuboidal epithelia. The epithelia are often cut into circles, and sometimes into parallel rows. What organ is the student most likely observing?
Answer: Simple cuboidal epithelia line the ducts of glands and also comprise most of the kidney. Depending on the other features of the slide, it is most likely a sweat gland or the kidney.
Diff: 1
Learning Outcome: 4-3
Skill Level: 2 Reviewing Concepts

3) Analysis of a glandular secretion indicates that it contains some DNA, RNA, and membrane components such as phospholipids. What kind of secretion is this, and why?
Answer: The presence of DNA, RNA, and membrane components suggests that the cell was destroyed during the process of secretion. This is consistent with a holocrine type of secretion.
Diff: 1
Learning Outcome: 4-3
Skill Level: 2 Reviewing Concepts

4) Jim and Pam are at the beach soaking up the sunlight when Pam notices that Jim's feet are very callused and hers are not. What would cause Jim's feet to be callused, while Pam's are not?
Answer: The stratified squamous epithelium of the skin (like many other tissues) responds to the stresses applied to it. The most likely scenario is that Jim puts more weight on his feet and is more active than Pam, resulting in more stress being applied to his feet. As a result, the stratified squamous epithelium of the soles of his feet has thickened.
Diff: 1
Learning Outcome: 4-3
Skill Level: 2 Reviewing Concepts
Labeling Exercises

Using the figure above, identify the labeled part.

1) Label A: ________
   Answer: Epithelia
   Diff: 1
   Learning Outcome: 4-1
   Skill Level: 1 Reviewing Facts and Terms

2) Label B: ________
   Answer: Connective tissue
   Diff: 1
   Learning Outcome: 4-1
   Skill Level: 1 Reviewing Facts and Terms

3) Label C: ________
   Answer: Muscle tissue
   Diff: 1
   Learning Outcome: 4-1
   Skill Level: 1 Reviewing Facts and Terms

4) Label D: ________
   Answer: Neural tissue
   Diff: 1
Learning Outcome:  4-1
Skill Level:  1 Reviewing Facts and Terms