

## **Chapter 3: Cells**

### **Test Bank**

---

#### **MULTIPLE CHOICE**

1. Which of the following is considered the control center of the cell?
  - a. Mitochondrion
  - b. Nucleus
  - c. Lysosome
  - d. Centriole

ANS: B

2. The mitochondrion is called the *power plant* of the cell because \_\_\_\_\_ within the mitochondrion.
  - a. most of the ATP is produced
  - b. all protein synthesis occurs
  - c. all DNA is located
  - d. all ribosomes are located

ANS: A

3. Which of the following is (are) found on the rough endoplasmic reticulum?
  - a. Ribosomes
  - b. Cilia
  - c. Lysosomes
  - d. DNA

ANS: A

4. The rough ER is the site of
  - a. fatty acid and steroid synthesis.
  - b. Krebs cycle activity.
  - c. protein synthesis.
  - d. intracellular water storage.

ANS: C

5. Which of the following is most associated with the ribosome?
  - a. ATP production
  - b. Intracellular housecleaning
  - c. Glycogen storage
  - d. Protein synthesis

ANS: D

6. What is the transport mechanism in this description: A passive process that “pulls” water from an area where there is more water to an area where there is less water?
  - a. Filtration
  - b. Endocytosis
  - c. An ATP-driven pump

d. Osmosis

ANS: D

7. What is the transport mechanism in this description: A passive process that uses a pressure difference as its driving force?
- Facilitated diffusion
  - An ATP-driven pump
  - Diffusion
  - Filtration

ANS: D

8. A beaker is divided into two compartments by a semipermeable membrane. Compartment A contains a 20% NaCl solution and compartment B contains a 50% NaCl solution. The membrane is permeable to water but not to  $\text{Na}^+$  or  $\text{Cl}^-$ . Initially,
- water diffuses from compartment B to compartment A.
  - $\text{Na}^+$  diffuses from compartment B to compartment A.
  - $\text{Na}^+$  diffuses from compartment A to compartment B.
  - water diffuses from compartment A to compartment B.

ANS: D

9. A beaker is divided into two compartments by a semipermeable membrane. Compartment A contains a 20% NaCl solution and compartment B contains a 50% NaCl solution. The membrane is permeable to water but not to  $\text{Na}^+$  or  $\text{Cl}^-$ . At equilibrium, the
- volume of water in compartment A will be greater than the volume in compartment B.
  - volume in both compartments A and B will be equal.
  - concentration of compartment A will decrease.
  - volume in compartment B will be greater than the volume in compartment A.

ANS: D

10. A beaker is divided into two compartments by a semipermeable membrane. Compartment A contains a 20% NaCl solution while compartment B contains a 50% NaCl solution. The membrane is permeable to both water and  $\text{Na}^+$  and  $\text{Cl}^-$ . Initially,
- $\text{Na}^+$  and  $\text{Cl}^-$  diffuse from compartment B to compartment A.
  - water diffuses from compartment B to compartment A.
  - $\text{Na}^+$  and  $\text{Cl}^-$  diffuse from compartment A to compartment B.
  - $\text{Na}^+$  diffuses from compartment A to compartment B and  $\text{Cl}^-$  diffuses from compartment B to compartment A.

ANS: A

11. A beaker is divided into two compartments by a semipermeable membrane. Compartment A contains a 20% NaCl solution and compartment B contains a 50% NaCl solution. The membrane is permeable to both water and  $\text{Na}^+$  and  $\text{Cl}^-$ . At equilibrium, the
- volume in compartment A will be greater than the volume in compartment B.
  - volume in compartment B will be greater than the volume in compartment A.
  - concentrations and volumes will be the same in both compartments.
  - concentration of salt is greater in compartment A than in compartment B.

ANS: C

12. What are the hairlike structures located on the outer surface of the cell membrane?
- Mitochondria
  - Ribosomes
  - Cilia
  - Centrioles

ANS: C

13. What is the extensive internal membrane system that forms channels and is concerned with the synthesis of protein and steroids?
- Mitochondria
  - Lysosomes
  - Endoplasmic reticulum
  - DNA

ANS: C

14. Lysosomes are filled with
- powerful enzymes that destroy cellular debris and pathogens.
  - cilia.
  - DNA.
  - blood.

ANS: A

15. Which of the following best describes the power or driving force for active transport?
- ATP
  - Pressure
  - DNA
  - H<sup>+</sup>

ANS: A

16. What is the transport mechanism in this description: A passive process that uses a carrier molecule to move a solute from an area of high concentration to an area of low concentration?
- Osmosis
  - An ATP-driven pump
  - Filtration
  - Facilitated diffusion

ANS: D

17. What is the name of the process in which an intracellular protein-containing vesicle fuses with the cell membrane and expels the protein to the outside of the cell?
- Endocytosis
  - Pinocytosis
  - Exocytosis
  - Phagocytosis

ANS: C

18. Which process describes phagocytosis and pinocytosis?
- Facilitated diffusion
  - Endocytosis
  - Filtration
  - Exocytosis

ANS: B

19. Which word means “the bursting of red blood cells”?
- Endocytosis
  - Hemolysis
  - Crenation
  - Catalyst

ANS: B

20. If a cell is placed in a hypotonic solution such as water, the cell will
- crenate.
  - shrink.
  - swell and burst.
  - differentiate.

ANS: C

21. Which type of solution causes crenation or shrinkage of submerged red blood cells?
- Hypotonic
  - Isotonic
  - Hypertonic
  - Water

ANS: C

22. Prophase, metaphase, anaphase, and telophase are phases of
- active transport.
  - mitosis.
  - differentiation.
  - pinocytosis.

ANS: B

23. G<sub>1</sub>, G<sub>2</sub>, the S phase, and the M phase are phases of
- the cell cycle.
  - mitosis.
  - protein synthesis.
  - the cell cycle that is specific to cancer cells.

ANS: A

24. Pinocytosis
- is a passive process.
  - requires a pressure gradient as its driving force.
  - refers to cellular drinking.

d. is a form of exocytosis.

ANS: C

25. Which of the following best describes normal saline?
- a. Radioactive
  - b. Hemolytic to red blood cells
  - c. Isotonic
  - d. Crenating to red blood cells

ANS: C

26. Which of the following best describes the eating of a bacterium by a lysosome?
- a. Differentiation
  - b. Phagocytosis
  - c. Meiosis
  - d. Hemolysis

ANS: B

27. In which structure is most DNA found?
- a. Nucleus
  - b. Mitochondrion
  - c. Lysosome
  - d. Golgi apparatus

ANS: A

28. Which structure is described as rough or smooth?
- a. Ribosome
  - b. Mitochondrion
  - c. Cilia
  - d. Endoplasmic reticulum

ANS: D

29. Which of the following is a gel-like substance located inside the cell but outside the nucleus?
- a. Nucleoplasm
  - b. Isotonic saline
  - c. Cytoplasm
  - d. Lysosomal enzymes

ANS: C

30. Which of the following most accurately describes diffusion?
- a. ATP-driven
  - b. Passive transport
  - c. Requires a pressure or pushing force
  - d. Causes solute to move uphill

ANS: B

31. The skunk makes his presence known by

- a. filtration.
- b. osmosis.
- c. active transport.
- d. diffusion.

ANS: D

32. Oxygen moves from the lungs (high concentration) into the blood (low concentration) in response to
- a. filtration.
  - b. osmosis.
  - c. diffusion.
  - d. endocytosis.

ANS: C

33. Which process describes the pushing of water across the capillary (blood vessel) membrane?
- a. Facilitated diffusion
  - b. Osmosis
  - c. Filtration
  - d. Pinocytosis

ANS: C

34. Which structure puts the finishing touches on and packages the protein for export from the cell?
- a. Mitochondrion
  - b. Golgi apparatus
  - c. Lysosome
  - d. Nucleolus

ANS: B

35. Which of the following structures make the rough endoplasmic reticulum look like sandpaper?
- a. Ribosomes
  - b. Globes of cytoplasm
  - c. ATP
  - d. Fragments of DNA

ANS: A

36. Which structure is described as a semipermeable lipid bilayer?
- a. Lysosome
  - b. Mitochondrion
  - c. Ribosome
  - d. Cell membrane

ANS: D

37. The selectively permeable membrane
- a. is a result of its composition; it is tough connective tissue, much like a ligament.
  - b. determines which substances enter and leave the cell.

- c. allows for the unrestricted movement of water and electrolytes across the cell membrane.
- d. permits diffusion but not osmosis.

ANS: B

38. Which of the following is least true of mitochondria?
- a. Found only within liver cells
  - b. Make most of the body's ATP
  - c. Contain enzymes that function aerobically
  - d. Located within the cytoplasm

ANS: A

39. Which of the following is a correct statement?
- a. Most ATP is produced in the mitochondria.
  - b. Mitochondria contain potent enzymes that digest cellular waste and debris.
  - c. Most DNA is located within the mitochondria.
  - d. The RER is concerned with phagocytosis.

ANS: A

40. A beaker contains two compartments. Compartment A (CA) contains a 10% salt solution and Compartment B (CB) contains a 20% salt solution. The membrane is permeable to the salt and water. At equilibrium,
- a. the volume in CA is greater than the volume in CB.
  - b. the volume in CA is less than the volume in CB.
  - c. the volume is the same in both compartments.
  - d. all water accumulates in CB.

ANS: C

41. A beaker contains two compartments. Compartment A (CA) contains a 10% salt solution and Compartment B (CB) contains a 20% salt solution. The membrane is permeable only to water. At equilibrium, the volume in
- a. CA is greater than the volume in CB.
  - b. CA is less than the volume in CB.
  - c. CB is less than the volume in CA.
  - d. CA is the same as the volume in CB.

ANS: B

42. Most  $K^+$  is located in the cells, with little  $K^+$  in the tissue spaces. What accounts for the movement of additional  $K^+$  into the cells?
- a.  $K^+$  in the tissue fluid diffuses into the cell.
  - b.  $K^+$  enters the cell in response to facilitated diffusion.
  - c.  $K^+$  is actively pumped into the cell.
  - d.  $K^+$  enters the cell because of pinocytosis.

ANS: C

43. A child has experienced a blow to the head causing a slow bleed. Although the bleeding has stopped, the blood clot continues to expand because

- a. brain tissue grows into the blood clot.
- b. plasma protein is used by the brain to make additional nerve tissue to replace what was damaged.
- c. the particles of the blood clot are osmotically active and draw water into the clot.
- d. pieces of the blood clot dissolve and are carried by the blood to the other side of the brain.

ANS: C

44. What is the primary difference between diffusion and facilitated diffusion?
- a. One is active and the other is passive.
  - b. One requires ATP and the other doesn't.
  - c. Diffusion involves the movement of a substance from high concentration to a lower concentration. Facilitated diffusion moves a substance from a lower concentration to a higher concentration.
  - d. Facilitated diffusion uses a "helper" molecule to move a substance passively.

ANS: D

45. What is the effect of an intravenous infusion of pure water?
- a. It is the same response as to the infusion of isotonic saline.
  - b. It is the same response as to the infusion of Ringer's solution.
  - c. The RBCs burst.
  - d. The RBCs shrink (crenation).

ANS: C

46. Which of the following describes the response of a red blood cell (RBC) to immersion in an isotonic solution?
- a. The RBC swells and bursts.
  - b. The RBC undergoes hemolysis.
  - c. The RBC undergoes crenation; it shrinks.
  - d. There is no net movement of water between the RBC and solution.

ANS: D

47. Plasma proteins determine
- a. plasma oncotic (osmotic) pressure.
  - b. capillary filtration pressure.
  - c. the rate of diffusion out of the capillary.
  - d. the size of the capillary pores.

ANS: A

48. If plasma protein leaks into the tissue spaces,
- a. edema develops.
  - b. the tissue space becomes dehydrated as excess tissue fluid enters the capillaries.
  - c. blood volume expands as excess fluid is absorbed into the blood vessels (capillaries).
  - d. all of the above occur.

ANS: A

49. Mitosis
- occurs only within sex cells.
  - produces two genetically identical cells.
  - occurs only within red blood cells.
  - causes a 50% reduction in chromosome number.

ANS: B

50. The first gap phase ( $G_1$ ), second gap phase ( $G_2$ ), and synthesis phase (S)
- occur during interphase.
  - include prophase, metaphase, anaphase, and telophase.
  - are stages of mitosis.
  - all of the above are true.

ANS: A

51. An anticancer drug that interferes only with mitosis
- is described as cell cycle M phase-specific.
  - is cell cycle phase-nonspecific.
  - is nontoxic.
  - stimulates neoplastic cell growth.

ANS: A

52. With regard to the cell cycle,
- the M phase is the same as interphase.
  - cells cannot enter phase  $G_0$  when they complete the cycle.
  - cell division occurs during the M phase.
  - prophase, metaphase, anaphase, and telophase occur during phase  $G_1$ .

ANS: C

53. A cell that “drops out” of the cell cycle
- enters  $G_0$ .
  - splits into two genetically identical cells.
  - reduces its chromosome number by 50%.
  - becomes a stem cell.

ANS: A

54. Which of the following best describes a cell that is necrotic?
- Dehydrated
  - Stem cell
  - Undifferentiated
  - Dead

ANS: D

55. Which of the following is true of a benign neoplasm?
- Metastatic lesion
  - Secondary tumor site
  - Cancerous
  - Noncancerous tumor

ANS: D

56. A cervical Pap smear indicates well-differentiated cells. You would interpret this as
- a normal cellular appearance.
  - evidence of edema.
  - evidence of necrosis.
  - evidence of cancer.

ANS: A

57. This cytoplasmic organelle contains the enzymes of the Krebs cycle and electron transport chain and is primarily concerned with the formation of ATP:
- rough endoplasmic reticulum.
  - smooth endoplasmic reticulum.
  - mitochondrion.
  - centriole.

ANS: C

58. Krebs cycle and electron transport chain enzymes
- are located within the mitochondria.
  - function anaerobically.
  - produce most of the lactic acid in the body.
  - account for the sandpaper-like appearance of the RER.

ANS: A

59. Which of the following is common to the ribosomes, rough ER, and Golgi apparatus?
- ATP-producing organelles
  - Protein synthesis
  - Ammonia producing
  - Glycogen storage

ANS: B

60. Prophase, metaphase, anaphase, and telophase
- are stages of cytokinesis.
  - occur during G<sub>1</sub>.
  - are concerned with the synthesis of DNA and the doubling of the chromosomes.
  - are stages of mitosis.

ANS: D

61. Telophase and cytokinesis
- mark the beginning of mitosis.
  - complete the splitting of a single cell into two identical cells.
  - are called the "resting" phases.
  - occur only within sex cells.

ANS: B

62. Methotrexate, an anticancer drug that interferes with cell replication, is most effective when the cancer cell is in the S phase of the cell cycle. Which of the following best describes methotrexate?
- Cell cycle phase specific
  - Stem cell stimulator
  - Anaplastic
  - Keratinized

ANS: A

63. A stem cell develops into a muscle cell. Which of the following most accurately describes this process?
- Differentiation
  - Malignant
  - Neoplastic
  - Necrotic

ANS: A

64. Compartment A contains a 5% glucose solution. Compartment B contains a 15% glucose solution. The membrane (dividing the beaker into compartments A and B) is permeable to both solute and solvent. Which of the following statements is true regarding the initial net flux?
- Water diffuses from compartment A to compartment B.
  - Glucose diffuses from compartment A to compartment B.
  - Solute diffuses from compartment A to compartment B.
  - Solvent diffuses from compartment B to compartment A.

ANS: A

65. Compartment A contains a 25% glucose solution. Compartment B contains a 15% glucose solution. The membrane (dividing the beaker into compartments A and B) is permeable to water but impermeable to glucose. Which of the following statements is true regarding the initial net flux?
- Water diffuses from compartment B to compartment A.
  - Glucose diffuses from compartment A to compartment B.
  - Solute diffuses from compartment A to compartment B.
  - Solvent diffuses from compartment A to compartment B.

ANS: A

66. At equilibrium the volume in compartment B is greater than the volume in compartment A. In which initial situation would this be achieved?
- There is a 5% glucose solution in compartment A and a 15% glucose solution in compartment B. The membrane (separating the beaker into compartments A and B) is impermeable to the solute and permeable to the solvent.
  - There is a 15% glucose solution in compartment A and a 5% glucose solution in compartment B. The membrane (separating the beaker into compartments A and B) is permeable to water and impermeable to glucose.
  - There is a 15% glucose solution in compartment A and a 15% glucose solution in compartment B. The membrane (separating the beaker into compartments A and

B) is permeable to both solute and solvent.

- d. There is a 25% glucose solution in compartment A and a 5% glucose solution in compartment B. The membrane (separating the beaker into compartments A and B) is permeable to solvent but impermeable to glucose.

ANS: A

67. The capillary filtration pressure (arterial end of the capillary) is 30 mm Hg and 7 mm Hg at the venous end. The capillary oncotic pressure is 15 mm Hg. Which of the following is true?
- Most water is filtered out of the capillary into the interstitium at the arterial end of the capillary.
  - The capillary oncotic pressure is responsible for the movement of water from the capillary into the interstitium.
  - The capillary oncotic pressure is responsible for the flow of blood from the arterial end of the capillary to the venous end of the capillary.
  - A decline in capillary oncotic pressure causes excess water to be reabsorbed from the interstitium.

ANS: A

68. Most body potassium ( $K^+$ ) is located intracellularly. Through what transport mechanism would additional  $K^+$  move from the extracellular compartment to the intracellular compartment?
- Osmosis
  - Active transport pump
  - Facilitated diffusion
  - Filtration

ANS: B

69. A red blood cell (RBC) is immersed in hypertonic saline. Which of the following describes the consequence? The RBC will
- replicate by mitosis.
  - actively pump water into the cell.
  - undergo hemolysis and burst.
  - shrink.

ANS: D

70. Which of the following is not true of glycogen? Glycogen
- is a storage form of glucose.
  - is an alcohol to which three fatty acids attach thereby forming a triglyceride.
  - helps in the regulation of blood glucose.
  - is stored within the liver and skeletal muscle.

ANS: B

71. This substance is composed of glycerol and three fatty acids.
- Glycogen
  - Polypeptide
  - Steroid
  - Triglyceride

ANS: D

72. Which of the following is not a lipid or lipoid substance?
- Steroids
  - Vitamins A, D, E, and K
  - Prostaglandins
  - Ammonia

ANS: D

73. Which group is correct?
- Lipids: triglycerides and urea
  - Polysaccharides: glycogen and glucose
  - Amino acids: ammonia and glycerol
  - Nitrogen-containing waste: urea and creatinine

ANS: D