

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 Na^+ or Cl^- . Initially,
- water diffuses from compartment B to compartment A.
 - Na^+ diffuses from compartment B to compartment A.
 - 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 Na^+ or 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 Na^+ and Cl^- . Initially,
- Na^+ and Cl^- diffuse from compartment B to compartment A.
 - water diffuses from compartment B to compartment A.
 - Na^+ and Cl^- diffuse from compartment A to compartment B.
 - Na^+ diffuses from compartment A to compartment B and 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 Na^+ and 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^+

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. G₁, G₂, 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 G₁.
 - 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