

Test – Lesson 4 – Take in Nutrients – Answer Key

1. Brownian movement is due to \_\_\_\_\_.
- (A) a concentration gradient of the solute
  - (B) a temperature gradient in the solvent
  - (C) an osmotic gradient of the solute
  - (D) random movement of solvent molecules**
2. The definition of “rate of diffusion” is \_\_\_\_\_.
- (A) the rate of change of the concentration of a solute
  - (B) the number of solute molecules passing a point per second**
  - (C) the time to reach equal concentration of solute throughout the solution
  - (D) the average rate of molecular movement during diffusion
3. The rate of diffusion through a liquid solvent is affected by \_\_\_\_\_.
- (A) temperature
  - (B) concentration gradient
  - (C) particle size
  - (D) all of the above**
4. Nutrients are best able to diffuse across a cell membrane into the cell when they \_\_\_\_\_.
- (A) are small
  - (B) have no electrical charge
  - (C) are non-polar
  - (D) all of the above**
5. A membrane that allows some atoms or molecules through but not others is called \_\_\_\_\_.
- (A) selective
  - (B) permeable
  - (C) semipermeable**
  - (D) porous
6. Pores in a membrane allow molecules to enter and exit a cell. Passage through the pores is guarded by “transport proteins.” One major advantage of using a transport protein is that \_\_\_\_\_.
- (A) nutrients can rapidly enter the cell regardless of the temperature
  - (B) nutrients do not have to expend energy to enter the cell
  - (C) nutrients can be transported into the cell even when the concentration of the nutrients outside the cell is low**
  - (D) nutrients do not clog the pores when too many nutrients try to enter the cell
7. Aquaporin is a protein that provides a channel for water molecules to pass

through a cell membrane, and is thus called a “channel protein.” Which statement about aquaporin is true?

- (A) Aquaporin uses ATP to allow water molecules and certain ions to pass through.
- (B) The movement of water through aquaporin is called facilitated diffusion.
- (C) Aquaporin uses no energy to transport water molecules but it does use energy when transporting ions.
- (D) Water molecules can only enter or exit a cell by passing through aquaporin.**

8. Which statement is true?

- (A) The concentration of calcium outside a cell is much higher than inside a cell.**
- (B) The concentration of sodium inside a cell is much higher than outside a cell.
- (C) The concentration of potassium outside a cell is much higher than inside a cell.
- (D) The movement of an ion down a concentration gradient across a cell membrane is called “active transport.”

9. The movement of water molecules across a cell membrane is called \_\_\_\_\_.

- (A) diffusion
- (B) facilitated diffusion
- (C) osmosis**
- (D) active transport

10. Which statement about an equilibrium is true?

- (A) A state of equilibrium exists across a semipermeable membrane when the concentration of solutes on either side of the semipermeable membrane is equal.
- (B) A state of equilibrium exists across a semipermeable membrane when the rate of movement of solute across the cell membrane in each direction is equal.**
- (C) A state of equilibrium across a semipermeable membrane cannot exist without active transport.
- (D) The concentration of solutes on either side of a semipermeable membrane reaches its equilibrium state at a constant rate.

11. Which statement is true?

- (A) Water flows from a hypertonic to a hypotonic solution.
- (B) Water flows from an isotonic to an hypotonic solution.
- (C) Water flows from a hypertonic to an isotonic solution.
- (D) Water flows from a hypotonic to a hypertonic solution.**

12. The most important reason for solutes in a solution to move across a

semipermeable membrane is the \_\_\_\_\_ of the solute.

- (A) concentration**
- (B) volume
- (C) temperature
- (D) polarity

13. The energy needed to run active transport is supplied by \_\_\_\_\_.

- (A) aquaporin
- (B) transport protein
- (C) adenosine triphosphate (ATP)**
- (D) kinetic energy of the solute

14. For a solute to be at equilibrium across a semipermeable membrane means \_\_\_\_\_.

- (A) the concentration of the solute on either side of the semipermeable membrane is now equal
- (B) the same number of solute molecules are crossing the semipermeable membrane in both directions**
- (C) the same amount of kinetic energy is being exerted by the solute on both side of the semipermeable membrane
- (D) the same as the solute are at a “steady state”

15. Red cells placed in a hypotonic solution will \_\_\_\_\_.

- (A) swell**
- (B) shrink
- (C) crenate
- (D) lose sodium

16. To lower osmotic pressure inside a cell, place the cell in a(n) \_\_\_\_\_ solution.

- (A) hypertonic**
- (B) hypotonic
- (C) isotonic
- (D) equilibrated

17. Plant cells are able to withstand high osmotic pressure because \_\_\_\_\_

- (A) they are able to undergo pinocytosis
- (B) they have a central vacuole
- (C) their cell membranes are reinforced with cellulose
- (D) they have cell walls around their cell membranes**