

# Osmosis Practice Problems

*Good practice for test-taking  
strategy, too.*

# By the end of this lesson...

- You should be able to solve word problems that require analysis of osmosis scenarios.

# #1

- If you soak your hands in dishwater, you may notice that your skin absorbs water and swells into wrinkles. This is because your skin cells are \_\_\_\_\_ to the \_\_\_\_\_ dishwater.
  - A. hypotonic...hypertonic
  - B. hypertonic...hypotonic
  - C. hypotonic...hypotonic
  - D. isotonic...hypotonic
  - E. hypertonic...isotonic

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  - C. hypotonic...hypotonic
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## #2

- You decide to buy a new fish for your freshwater aquarium. When you introduce the fish into its new tank, the fish swells up and dies. You later learn that it was a fish from the ocean.

## #2

- Based on what you know of tonicity, the most likely explanation is that the unfortunate fish went from a(n) \_\_\_\_\_ solution into a(n) \_\_\_\_\_ solution.
  - A. Isotonic...hypotonic
  - B. hypertonic...isotonic
  - C. hypotonic...hypertonic
  - D. hypotonic...isotonic
  - E. isotonic...hypertonic

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# #3

- In osmosis, water always moves toward the \_\_\_\_\_ solution: that is, toward the solution with the \_\_\_\_\_ solute concentration.
  - A. isotonic...greater
  - B. hypertonic...greater
  - C. hypertonic...lesser
  - D. hypotonic...greater
  - E. hypotonic...lesser



# #3

- In osmosis, water always moves toward the \_\_\_\_\_ solution: that is, toward the solution with the \_\_\_\_\_ solute concentration.
  - A. isotonic...greater
  - B. hypertonic...greater**
  - C. hypertonic...lesser
  - D. hypotonic...greater
  - E. hypotonic...lesser

# #4

- The concentration of solutes in a red blood cell is about 2%. Sucrose cannot pass through the membrane, but water and urea can. Osmosis would cause red blood cells to shrink the most when immersed in which of the following solutions?
  - A. a hypertonic sucrose solution
  - B. a hypotonic sucrose solution
  - C. a hypertonic urea solution
  - D. a hypotonic urea solution
  - E. pure water

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  - D. a hypotonic urea solution
  - E. pure water

# #5

- Sea water is dangerous to drink because
  - A. one cup of sea water contains enough sodium to poison you.
  - B. sea water is hypertonic to your body tissues and drinking it will cause you to lose water.
  - C. sea water is isotonic to your body fluids and you will absorb too much water.
  - D. the salt causes hypertension and you will promptly die of a stroke.
  - E. it contains toxic levels of iodine.

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# #6

- If the volume of a cell increases when it is placed in a solution, that solution is said to be \_\_\_\_\_ to the cell.
  - A. hypertonic
  - B. subatomic
  - C. isotonic
  - D. gin and tonic
  - E. hypotonic

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# #7

- Inside one osmosis bag\*, A, is a 50% glucose solution and inside bag B is a 20% glucose solution. Both bags are put into beakers containing 100% water.
  - \*Osmosis bags are membranes that let water through but not glucose.
- A. Bag A will gain weight.
- B. Bag B will gain weight.
- C. Both bags will gain weight.
- D. Both bags will lose weight.
- E. Both bags will remain the same.



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  - \*Osmosis bags are membranes that let water through but not glucose.
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- B. Bag B will gain weight.
- C. **Both bags will gain weight.**
- D. Both bags will lose weight.
- E. Both bags will remain the same.

# #8

- A 0.9% NaCl solution is isotonic to red blood cells. Which of these describes the results if red blood cells are placed into a 9% solution of NaCl?
  - A. They will burst.
  - B. They will shrink.
  - C. Nothing will happen.
  - D. They will expand but not burst.
  - E. None of the above.

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# #9

- Wallway is a new general herbicide for aquatic plants. Its main ingredient is a marine salt solution. It is effective against freshwater but not saltwater plants. It works by breaking down the cell walls of the plants. The freshwater plants die because their cells
  - A. swell and cease to function.
  - B. shrink.
  - C. remain the same size but malfunction.
  - D. are crushed by the weight of the plant.
  - E. [not enough information to tell]

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# #10

- A red blood cell has a salt concentration of 0.9%. What will happen if it is placed into a 1% salt solution? The red blood cell will
  - A. shrink if its membrane is permeable to both the salt and the water.
  - B. shrink if its membrane is impermeable to the salt and permeable to the water.
  - C. maintain its shape - nothing will happen.
  - D. swell and probably burst because its membrane is impermeable to salt and permeable to water.
  - E. swell and probably burst because its membrane is impermeable to water and permeable to salt.

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# #11

- Flasks X, Y, and Z contain solutions with different concentrations of the solute NaCl.
  - Flask X has 0.5% NaCl
  - Flask Y has 0.9% NaCl
  - Flask Z has 1.5% NaCl
- Red blood cells (0.9% NaCl) will be placed into each flask. Predict what will happen to the blood cells in each of the flasks.
  - A. **Flask X: Contract      Flask Y: Unchanged      Flask Z: Swell**
  - B. **Flask X: Swell      Flask Y: Unchanged      Flask Z: Contract**
  - C. **Flask X: Unchanged      Flask Y: Swell      Flask Z: Contract**
  - D. **Flask X: Unchanged      Flask Y: Unchanged      Flask Z: Unchanged**



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  - B. **Flask X: Swell      Flask Y: Unchanged      Flask Z: Contract**
  - C. **Flask X: Unchanged      Flask Y: Swell      Flask Z: Contract**
  - D. **Flask X: Unchanged      Flask Y: Unchanged      Flask Z: Unchanged**