

Review Questions for Diffusion and Osmosis topic

Review questions will not be collected and are not worth any points. Doing them will, however, help you prepare for the midterms and quizzes in this course. Furthermore, some of these review questions will appear on the final exam (although the numbers within the questions may be changed).

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1) The best term used to describe molecules that do not mix well with water is

- A) hydrophilic.
- B) lipophobic.
- C) hydrophobic.
- D) ionic.

2) If you dissolve red paint powder into water, the paint powder is the ____.

- A) Ion
- B) Solute
- C) Solution
- D) Concentration

3) If you made red paint by dissolving dry red paint powder into water, the liquid red paint you make is a _____.

- A) Ion
- B) Solute
- C) Solution
- D) Concentration

4) If you put a sugar cube into a glass of water, at first the sugar molecules will be concentrated in the cube, but after some time, they will spread out throughout the water. This is an example of...

- A) Osmosis
- B) Cell membranes
- C) Buffering
- D) Diffusion

5) Most solutes inside cells stay inside the cell because the _____ stops them from diffusing outward.

- A) Cell membrane
- B) Water molecules
- C) Solutes
- D) Osmosis

6) A swimmer urinates while swimming in a lake. At first the urine molecules are concentrated close by the swimmer, but after a short time the molecules will spread out throughout the lake. This is an example of...

- A) Osmosis
- B) Diffusion
- C) Lysis
- D) Isotonic
- E) Hydrophobic

7) If you place a cell in a glass of very salty water, by osmosis the cell will...

- A) Gain water
- B) Lose water
- C) Gain salt
- D) Lose salt

8) Any solution that has a higher solute concentration than a cell is called a(n) _____ solution.

- A) Hypotonic
- B) Isotonic
- C) Hypertonic
- D) Hypodermic

9) The term used to describe all molecules that do mix well with water (or that are attracted to water) is

- A) hydrophilic.
- B) lipophobic.
- C) hydrophobic.
- D) ionic.

10) The most abundant molecule in our bodies is _____. Its molecular formula is _____.

11) Define each term below, as it was defined in class:

a) Osmosis

b) Diffusion

c) Isotonic

d) Hypotonic

e) Hypertonic

f) Osmolarity

g) Hydrophilic

h) Hydrophobic

i) Lysis

j) Crenation

k) Solute

l) Solvent

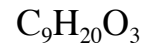
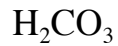
m) Solution

12) If you dissolve salt in pure water, the salt is the _____, the pure water is the _____, and the salt water that you make is called the _____.

13) Give an example of a household substance that is hydrophobic.

14) Give an example of a household substance that is hydrophilic.

15) Circle the most hydrophobic molecule below (the molecule below that is least able to dissolve in water).



16) Describe the “like mixes with like” principle, as it was described in class.

17) Most solutes diffuse easily through water, but not through cell membranes. Why don't most solutes diffuse through cell membranes?

18) The term _____ means the movement of water molecules across a cell membrane toward the side of the membrane that has the higher solute concentration.

19) All cells have a certain internal solute concentration. If a cell is placed in a glass of pure water (no solutes), water molecules will move in/out (circle one) of the cell by osmosis.

20) A solution that has a higher solute concentration than a cell is called a(n) _____ solution. All cells will gain/lose/neither gain nor lose (circle one of the three) water if placed in such a solution.

21) A solution that has a lower solute concentration than a cell is called a(n) _____ solution. All cells will gain/lose/neither gain nor lose (circle one of the three) water if placed in such a solution.

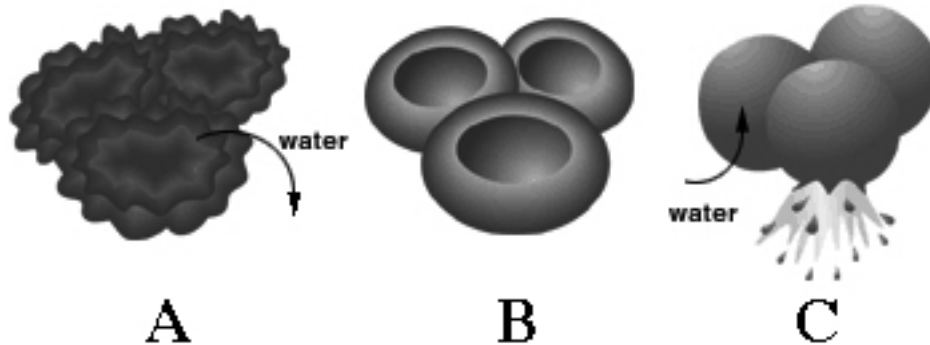
22) A solution that has an equal solute concentration compared to a cell is called a(n) _____ solution. All cells will gain/lose/neither gain nor lose (circle one of the three) water if placed in such a solution.

23) List three common isotonic IV solutions used in hospitals, which were listed in class. Circle the one that becomes hypotonic after it is administered to a patient.

24) Red blood cells in a hypertonic solution will _____ (use the proper term).

25) Red blood cells in a hypotonic solution will _____ (use the proper term).

26) The image below shows three groups of red blood cells (RBCs). From the appearance of the RBCs, which group of RBCs (A, B, or C) are in isotonic solution? _____. Which group of RBCs are in hypotonic solution? _____. Which group of RBCs are in hypertonic solution? _____.



27) Before the invention of refrigerators, pioneers preserved meat by salting it. Explain how meat can be preserved by this procedure. (Hint: Think about what salting the meat would do to decomposer organisms on the surface of the meat, such as bacteria and fungi).

30) The blood and the tissue fluid are together called the _____ fluid of the patient.

31) The cytoplasm of the all cells is called the _____ fluid of the patient.

32) If a patient became dehydrated, the patient's extracellular fluids would become hypertonic/hypotonic/isotonic (circle one of the three words).

33) In class, we listed several common causes of dehydration of patient. Listed any of these common causes of dehydration.

34) If a patient was severely dehydrated, in the hospital the patient would be given a hypertonic/hypotonic/isotonic (circle one of the three words) IV solution.

Answers for Review Questions for Diffusion/Osmosis Review topic:

1) C

2) B

3) C

4) D

5) A

6) B

7) B

8) C

9) A

10) Water



11) (a) The movement of water molecules across a membrane toward the side with the higher solute concentration.

(b) The movement of solute molecules from areas of higher concentration to areas of lower concentration.

(c) A solution with the same solute concentration as a cell.

(d) A solution with a lower solute concentration than a cell.

(e) A solution with a higher solute concentration than a cell.

(f) The total moles of solute particles per liter.

(g) Any substance that dissolves in water or is attracted to water.

(h) Any substance that does not dissolve in water and is not attracted to water.

(i) Bursting or tearing open.

(j) Shrunken and shriveled.

(k) A substance that becomes dissolved in a liquid.

(l) A liquid that is used to dissolve a substance.

- (m) The mixture of a liquid and the substances dissolved in that liquid.
- 12) Solute
Solvent
Solution
- 13) Examples: Butter, oil, grease, wax.
- 14) Examples: Salt, sugar.
- 15) $C_9H_{20}O_3$ circled.
- 16) Hydrophilic substances mix with other hydrophilic substances, not with hydrophobic substances. Hydrophobic substances mix with other hydrophobic substances, not with hydrophilic substances.
- 17) Cell membranes are hydrophobic. Most solutes are hydrophilic. For the hydrophilic solutes to diffuse through the membrane, they would have to mix with the hydrophobic membrane, which violates the “like mixes with like” principle.
- 18) Osmosis
- 19) In
- 20) Hypertonic
Lose
- 21) Hypotonic
Gain
- 22) Isotonic
Neither gain nor lose
- 23) 0.9% saline, Ringer's lactate, 5% dextrose (circled)
- 24) Crenate
- 25) Lyse

- 26) Isotonic = B
Hypotonic = C
Hypertonic = A

27) Coating the meat with salt creates an extremely high salt solute concentration on the surface of the meat. By osmosis, this draws out much of the water from the cells on the surface of the meat. Losing water does not hurt the meat cells (they are already dead) but any living bacteria and fungal cells on the meat surface will be killed by losing their water. This preserves the meat from decay.

30) Extracellular fluid (ECF)

31) Intracellular fluid (ICF)

32) Hypertonic

33) [Any of the dehydration causes listed below]

Excessive sweating

Severe diarrhea

Severe vomiting

Decreased thirst/decreased fluid intake

Diabetes

High blood pressure

34) Hypotonic