

## Diffusion and Osmosis Chemistry Questions with Solutions

**Q1.** The passage of water across a selectively permeable membrane is known as

- (a) Osmosis
- (b) Diffusion
- (c) Facilitated diffusion
- (d) None of the above

**Answer:** (a) The passage of water across a selectively permeable membrane is known as osmosis.

**Q2.** Which of the following solutions contains a low solute concentration relative to another solution?

- (a) Hypotonic solution
- (b) Isotonic solution
- (c) Hypertonic solution
- (d) None of the above

**Answer:** (a) A hypotonic solution contains a low concentration of solute relative to another solution.

**Q3.** Reverse osmosis is also known as

- (a) Hyperfiltration
- (b) Hyper osmosis
- (c) Double osmosis
- (d) None of the above

**Answer:** (a) Reverse osmosis is also known as hyperfiltration.

**Q4.** Transpiration is a phenomenon pertaining to

- (a) Diffusion
- (b) Osmosis
- (c) Facilitated diffusion
- (d) None of the above

**Answer:** (a) Transpiration is a phenomenon pertaining to diffusion.

**Q5.** Which of the following phenomena is responsible for raisins' swelling in water?

- (a) Diffusion
- (b) Adsorption
- (c) Endosmosis
- (d) None of the above

**Answer:** Endosmosis is responsible for the swelling of raisins in water.

**Q6.** What is diffusion?

**Answer:** Diffusion refers to the movement of particles from high concentration to low concentration.

**Example:** The smell of food cooked in the kitchen diffuses in the entire house is an example of diffusion that we encounter in everyday life. Moreover, perfume fragrance also spreads throughout the room. It is also an example of diffusion.

**Q7.** What is Graham's law of diffusion?

**Answer:** Graham's law of diffusion states that the rate of diffusion of gases is inversely proportional to the square roots of their densities. It is applicable only to gases.

**Q8.** What is osmosis?

**Answer:** Osmosis refers to the movement of particles from low concentration to high concentration through a semi-permeable membrane.

**Example:** Absorption of water from the soil and swelling of raisins when placed in water are examples of osmosis that we encounter in everyday life.

**Q9.** What are the various factors that affect the rate of osmosis?

**Answer:** Various factors that affect the rate of osmosis are mentioned below.

1. Surface Area
2. Temperature
3. Pressure
4. Concentration gradient
5. Water Potential

**Q10.** What is osmotic pressure?

**Answer:** Osmotic pressure refers to the minimum pressure that must be applied to stop osmosis, i.e. the movement of particles from low concentration to high concentration through a semi-permeable membrane.

$$\pi = iCRT$$

Here,

$\pi$  = Osmotic Pressure

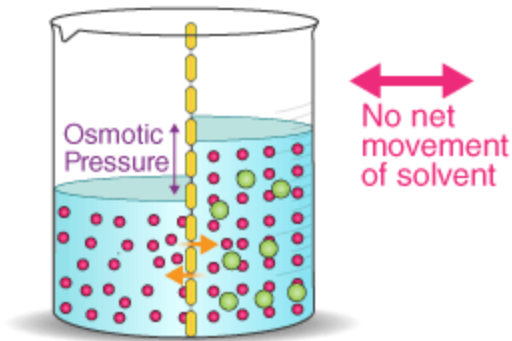
$i$  = Vant Hoff factor

$C$  = Molar concentration of the solute

$R$  = Gas Constant

$T$  = Temperature.

It depends on the molar concentration of the solute particles in the solution and the surrounding temperature.



**Q11.** What is an osmotic solution?

**Answer:** A solution with the tendency and power to perform osmosis is known as an osmotic solution. We can classify osmotic solutions into three kinds.

1. Isotonic solution
2. Hypertonic Solution
3. Hypotonic Solution

**Q12.** What are isotonic, hypertonic and hypotonic solutions?

**Answer: Isotonic Solutions:** An isotonic solution is a solution that has an equal concentration of solutes inside and outside the cell.

**Hypertonic Solutions:** A hypertonic solution is a solution that has a high concentration of solute outside the cell than inside.

**Hypotonic Solutions:** A hypotonic solution is a solution that has a high concentration of solute inside the cell than outside.

**Q13.** What are the different types of osmosis?

**Answer:** We can classify osmosis into two types, i.e.

1. Endosmosis: Endosmosis occurs when a substance is placed in a hypotonic solution, where the solute concentration is more inside the cell than outside. The solvent molecules will move inside the cell in a hypotonic solution, and the cell will become more turgid or undergo deplasmolysis.
2. Exosmosis: Exosmosis occurs when a substance is placed in a hypertonic solution, where the solute concentration is less inside the cell than outside. The solvent molecules will move outside of the cell in a hypertonic solution, and the cell will become more flaccid or undergo plasmolysis.

**Q14.** What are the various factors that affect the rate of diffusion?

**Answer:** Various factors that affect the rate of diffusion are mentioned below.

1. Temperature
2. Size of the Particle
3. Area of Interaction
4. Concentration gradient steepness

**Q15.** Match the following.

Column I	Column II
Diffusion	Hydrophite substances.
Osmosis	Shrinkage protoplasm.
Imbibition	Semipermeable membrane.
Plasmolysis	Free movement of ions and gases.

**Answer:**

Column I	Column II
Diffusion	Free movement of ions and gases.
Osmosis	Semipermeable membrane.
Imbibition	Hydrophite substances.
Plasmolysis	Shrinkage protoplasm.

## Practise Questions on Diffusion and Osmosis

**Q1.** Differentiate between osmosis and diffusion.

**Answer:**

S. No.	Osmosis	Diffusion
1.	Osmosis refers to the movement of particles from low concentration to high concentration through a semi-permeable membrane.	Diffusion refers to the movement of particles from high concentration to low concentration.

2.	It is applicable only to the liquid medium.	It is applicable to solids, liquids and gases.
3.	It requires a semipermeable membrane.	It doesn't require a semipermeable membrane.
4.	It depends on the number of solute particles dissolved in the solvent.	It depends on the presence of other particles.
5.	In it, only the solvent molecules can diffuse.	In it, both molecules of solute and solvent can diffuse.
6.	It depends on solute potential.	It does not depend on solute potential, pressure potential, or water potential.
7.	<b>Example: Movement of water and minerals from root nodules to various parts of plants and the movement of saltwater in the animal cell across our cell membrane.</b>	<b>Example: The smell of food cooked in the kitchen diffuses in the entire house, perfume fragrance spreads throughout the room.</b>

**Q2.** What is reverse osmosis?

**Answer:** Reverse osmosis is a natural phenomenon that occurs in the opposite direction of natural osmosis. This type of osmosis removes most contaminants from water by pushing the water under pressure through a semi-permeable membrane.

**Q3.** Give some examples of osmosis that we encounter in everyday life?

**Answer:** We meet osmosis

1. When we feel thirsty after eating salty food.
2. During dialysis of the kidney in the excretory system.
3. Movement of water and minerals from root nodules to various parts of plants.
4. Movement of saltwater in the animal cell across our cell membrane.
5. Swelling resins and other seeds when soaked in water.

**Q4.** What is dialysis?

**Answer:** Dialysis is a separatory technique used to separate colloids from solution with the help of a semi-permeable membrane.

**Q5.** Explain different types of diffusion.

**Answer:** There are two types of diffusion.

1. Simple diffusion: It is a process in which the substance moves via a semipermeable membrane in a solution without any help of transport proteins.

2. Facilitated diffusion: It is a process in which the passive movement of molecules across the cell membrane via a carrier molecule takes place.

