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The Amazing World of Solutes, Solvents, and Solutions

Fill in the Blanks

1. The volume of a solid can be measured by the method of _____, where the solid is immersed in water and the rise in water level is measured.
2. The maximum amount of solute dissolved in solvent at a particular temperature is called _____.
3. Generally, the density decreases with increase in _____.
4. A solution in which no more solute can dissolve at a given temperature is called a _____ solution.
5. The amount of matter present in an object is called its _____.
6. The space occupied by an object is called its _____.
7. A mixture of gases like air is a _____.
8. The _____ of ice is less than that of water; hence, ice floats.

True or False

1. Oxygen gas is more soluble in hot water than cold water. _____
2. A mixture of sand and water is a solution. _____
3. The amount of space occupied by an object is called its mass. _____
4. An unsaturated solution has more solute dissolved than a saturated solution. _____
5. The mixture of gases in the atmosphere is also a solution. _____

Multiple Choice Questions (MCQs)

1. The substance that dissolves in a solvent is called:

- a) Solvent b) Solution c) Solute d) Concentrate

2. Air is a:

- a) Compound b) Solution c) Element d) Suspension

3. Which of the following increases solubility of solids?

- a) Increasing temperature b) Decreasing temperature c) Shaking d) Cooling

4. The unit of density in SI is:

- a) kg/m^3 b) g/cm^3 c) g/mL d) m^3/kg

5. The solution that cannot dissolve any more solute is:

- a) Saturated solution b) Unsaturated solution c) Concentrated solution d) Dilute solution

6. Ice floats on water because:

- a) It is less dense b) It is heavier c) It melts d) It expands

7. Density = ?

a) Volume / Mass b) Mass / Volume c) Force / Area d) None

8. Solubility of gases in liquids _____ with increase in temperature.

a) Decreases b) Increases c) Remains same d) Doubles

9. A 1 L bottle has 500 mL of water. It can hold _____ more water.

a) 500 mL b) 1 L c) 250 mL d) 750 mL

10. Which property helps explain floating or sinking?

a) Density b) Mass c) Volume d) Pressure

Short Answer Questions

1. Define solute, solvent, and solution with examples.

2. Differentiate between saturated and unsaturated solutions.

3. What happens to solubility of a solid when temperature increases?

4. Why does ice float on water?

5. What is density and its formula?

6. What happens to density when temperature increases?

7. What does it mean when oil floats on water?

Long Answer Questions

1. Explain the effect of temperature on solubility of solids and gases.

Ans:

2. Describe the steps to measure the density of an irregular solid.

Ans:

3. What is relative density? How is it useful?

Ans:

One Point Learning

Answers

Fill in the Blanks

1. displacement
2. solubility.
3. temperature.
4. saturated
5. mass.
6. volume.
7. solution.
8. density

True or False

1. **False** It is more soluble in cold water.
2. **False** It is a non-uniform mixture.
3. **False** It is called volume.
4. **False** A saturated solution has more solute.
5. **True**

Multiple Choice Questions (MCQs)

1. c) Solute
2. b) Solution
3. a) Increasing temperature
4. a) kg/m^3
5. a) Saturated solution
6. a) It is less dense
7. b) Mass / Volume
8. a) Decreases
9. a) 500 mL
10. a) Density

Short Answer Questions

1. Define solute, solvent, and solution with examples.

→ Solute: The substance that dissolves.

Solvent: The substance in which the solute dissolves.

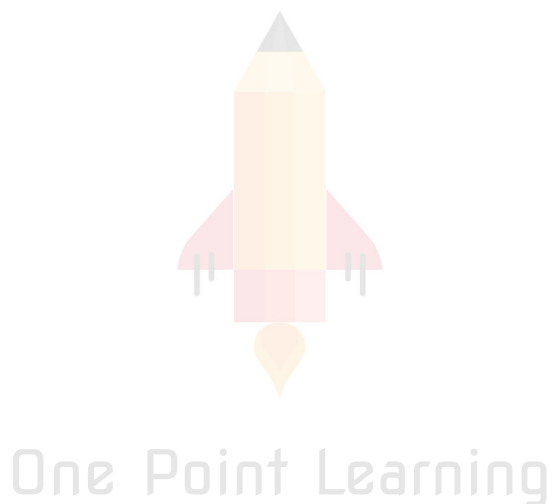
Solution: Uniform mixture (e.g., Salt + Water → Salt solution).

2. Differentiate between saturated and unsaturated solutions.

→ Saturated solution cannot dissolve any more solute; extra solute settles at the bottom. While unsaturated solution can still dissolve more solute at same temperature.

3. What happens to solubility of a solid when temperature increases?

→ When the temperature increases, the particles of the solvent gets more energy and moves faster to break the bonds between the solute particles. Therefore, solubility of a solid increases when temperature increases.



4. Why does ice float on water?

→ Ice has lower density than liquid water. Thus it floats on water.

5. What is density and its formula?

→ Density is the amount of mass contained in a unit volume of a substance. It tells us how tightly the particles of a substance are packed together. $\text{Density} = \text{Mass} \div \text{Volume}$.

6. What happens to density when temperature increases?

→ As temperature increases, the density of a substance generally decreases because its volume increases while mass remains constant.

7. What does it mean when oil floats on water?

→ When oil floats on water, it means that oil is less dense than water.

Long Answer Questions**1. Explain the effect of temperature on solubility of solids and gases.**

Ans:

- For most solids: Solubility increases with temperature.
- For gases: Solubility decreases with temperature.
- Example: Oxygen dissolves more in cold water than warm water.

2. Describe the steps to measure the density of an irregular solid.

Ans:

- Measure its mass using a balance.
- Measure volume by water displacement method.
- Use formula $\text{Density} = \text{Mass} / \text{Volume}$.

3. What is relative density? How is it useful?

Ans:

- Ratio of density of a substance to density of water.
- Helps predict floating and sinking.
- Explain why hot air balloons rise.
- Heated air expands, becomes less dense, and rises above cooler air.