CHEMISTRY

BOOKS - ICSE

WATER

Example

1. 2.5 litres of alcohol is present in 10 litres of aqueous solution of alcohol. Calculate volume percent.

Volume of solute = 2.5 litres

Volume of solution = 10.0 litres

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2. 50 gram of sugar is dissolved in $2 \cdot 45$ kg of water. Calculate the concentration of solution.

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3. 12 g of a saturated solution of potassium chloride at $20^{\circ} C$, when evaporated to

dryness, leaves a solid residue of 3 g. Calculate the solubility of potassium chloride.

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4. Find the weight of sodium nitrate required to prepare 60 g pure crystals from its saturated solution at $70^\circ C$. Solubility of sodium nitrate is 140 g at $70^\circ C$ and 100 g at $25^\circ C$.

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Exercise 3 A

1. Water exists in all the three states. Discuss.

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2. Why is water considered a compound ?

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3. Why does temperature in Mumbai and Chennai not fall as low as it does in Delhi?

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4. Give the properties of water responsible for controlling the temperature of our body.

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5. Water is a universal solvent'. Comment

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6. What causes the violence associated with torrential rain ?

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7. Which property of water enables it to modify the climate?

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8. Density of water varies with temperature. What are its consequences ?

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9. What is the effect of impurities present in water on melting point and boiling point of water?

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10. How do fishes and aquatic animals survive in winters when the pond gets covered with thick ice?

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11. The properties of water are different from the properties of the elements of which it is formed. Discuss.

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12. How is aquatic life benefitted by the fact that water has maximum density at 4°C ?

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13. What are your observations and conclusion when tap water is boiled and evaporated in watch glass?

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14. What is the importance of dissolved salts in water ?

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15. State the importance of the solubility of CO_2 and O_2 in water.

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16. How is air dissolved in water different from ordinary air?

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17. Explain why :

Boiled or distilled water tastes flat.

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18. Explain why :

Ice at zero degree centigrade has greater cooling effect than water at $0^{\circ} C$.

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19. Explain the following:

Why are the burns caused by steam more severe than those caused by boiling water?

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20. Explain why :

Rivers and lakes do not freeze easily?

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21. Explain why :

Air dissolved in water contains a higher proportion of oxygen.

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22. Explain why :

If distilled water is kept in a sealed bottle for a long time, it leaves etchings on the surface of the glass.

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23. Explain why: Rainwater does not leave behind concentric rings when boiled.

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Exercise 3 B

1. Explain the terms:

solution

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2. Explain the terms:

solute

Watch Video Solution

3. Explain the terms:

solvent.

Watch Video Solution

4. Explain why hot saturated solution of potassium nitrate forms crystals as it cools.

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5. Explain any three factors which affect the solubility of a solid solute in a solvent.

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6. If you are given some copper sulphate crystals, how would you proceed to prepare its saturated solution at room temperature ?

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7. How can you show that your solution is really saturated ?

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8. Define (1) Henry's law (ii) Crystallization (iii) Seeding,

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9. State any three methods of crystallization.

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10. What would you observe when crystals of copper (II) sulphate are heated in a test tube strongly?

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11. Give the names and formulae of two substances in each case

hydrated substance

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12. Give the names and formulae of two substances in each case

anhydrous substance

Watch Video Solution

13. Give the names and formulae of two substances in each case

liquid drying agent

Watch Video Solution

14. Give the names and formulae of two substances in each case

a basic drying agent

Watch Video Solution

15. What is the effect of temperature on solubility of KNO_3 and $CaSO_4$ in water ?

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16. Solubility of NaCl at $40^{\circ} C$ is 36.5 g. What is meant by this statement ?

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17. Which test will you carry out to find out if a given solution is saturated or unsaturated or supersaturated ?

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18. What is the effect of pressure on solubility of gases. Explain with an example.

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19. State the term : (Do not give examples)

A solution where solvent is a liquid other than water.

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20. Give suitable chemical terms for

The process in which a substance absorbs moisture from the atmospheric air to become moist, and ultimately dissolves in the absorbed water.

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21. State the term : (Do not give examples)

A substance which contains water of crystallisation.

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22. State the term : (Do not give examples)

When a substance absorbs moisture from the atmosphere, but does not form solution.

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23. State the term : (Do not give examples)

When a compound loses its water of crystallisation on exposure to dry air.

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24. State the term : (Do not give examples)

The substance that can remove hydrogen and oxygen atoms in the ratio of 2:1 (in the form of water) from the compounds.

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25. Explain why:

water is an excellent liquid to use in cooling systems.

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26. Explain why : A solution is always clear and transparent.

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27. Explain why :

Rivers and lakes do not freeze easily?

Watch Video Solution

28. Explain why : The solute cannot be separated from a solution by filtration.

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29. Explain why : Fused $CaCl_2$ or conc. H_2SO_4 is used in a desiccator.

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30. Explain why : Effervescence is seen on opening a bottle of soda water.

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31. Table salt becomes sticky on exposure to humid air during rainy season. Explain.

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32. Normally, solubility of a crystalline solid increases with temperature. Does it increase uniformly in all cases ? Name a substance

whose solubility :

increases gradually with temperature.

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33. Normally, solubility of a crystalline solid increases with temperature. Does it increase uniformly in all cases ? Name a substance whose solubility :

increases gradually with temperature.

Watch Video Solution

34. Normally, solubility of a crystalline solid increases with temperature. Does it increase uniformly in all cases ? Name a substance whose solubility :

increases gradually with temperature.

 Watch Video Solution

35. Normally, solubility of a crystalline solid increases with temperature. Does it increase uniformly in all cases ? Name a substance

whose solubility :

increases gradually with temperature.

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36. What are drying or desiccating agents. Give examples.

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37. In which of the following substances will there be:

no change in mass when they are exposed to air ? 1. Sodium chloride 2. Iron 3. Conc, sulphuric acid 4. Table salt 5. Sodium carbonate crystals

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38. Name the three methods by which hydrous substances can be made anhydrous.

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Exercise 3 C

1. What is the composition of water? In what volume its elements combine ?

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2. What is the use of solubility of oxygen and carbon dioxide in water?

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3. Hot saturated solution of sodium nitrate forms crystals, as it cools. Why?

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4. What are hydrous substances ? Explain with examples.

Watch Video Solution

5. Name the three methods by which hydrous substances can be made anhydrous.

Watch Video Solution

6. What is the importance of dissolved impurities in water?

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7. State two ways, by which a saturated solution can be changed to unsaturated solution.

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8. What do you understand by

Soft water

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9. What do you understand by

Hard water

Watch Video Solution

10. What do you understand by

Temporary Hard water

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11. What do you understand by

Permanent hard water.

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12. What are the causes for

Temporary hardness

13. What are the causes for

Permanent hardness

14. What are the advantages of (i) soft water (ii) hard water?

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15. What are stalagmites and stalactites? How are they formed ?

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16. Name the substances which give water (i) temporary hardness (ii) permanent hardness.

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17. Give equations to show what happens when temporary hard water is

boiled

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18. Give equations to show what happens when temporary hard water is treated with slaked lime.

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19. State the disadvantages of using hard water.

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20. What is a soap, what for is it used ?

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21. What is the advantage of a detergent over soap ?

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22. Why does the hardness of water render it unfit for use in a (i) boiler (ii) for washing

purposes ?

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23. Explain with equation, what is noticed when permanent hard water is treated with slaked lime

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24. What happens when hard water is treated with washing soda?

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25. What is permutit method, how can it be used for softening hard water?

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Topic 1 Water 1 Mark Questions

1. Water molecule has ____ bonding in it. [ionic, covalent]

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2. Land and sea breeze are caused by property of water [specific heat capacity, latent heat of vaporisation]

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3. _____ Gas is more soluble in water. [nitrogen/oxygen]

Watch Video Solution

4. The boiling point of water _____ due to the presence of dissolved impurities. [increases/decreases]

Watch Video Solution

5. Match the following

Column A	Column B
(i) Anomalous expansion of water	A. Specific value is 2268 J/g
(ii) Universal solvent	B. dissolved salts
(iii) Tap, river, well water	C. high dielectric constant
(iv) Latent heat of Vaporisation of water	D. maximum density at 4°C

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6. Why is water considered a compound ?

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7. Give the properties of water responsible for controlling the temperature of our body.

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8. Water is a universal solvent'. Comment

Watch Video Solution

9. What causes the violence associated with torrential rain ?

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10. How do fishes and aquatic animals survive in winters when the pond gets covered with thick ice?

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11. Explain why :

Rivers and lakes do not freeze easily?

Watch Video Solution

12. Explain why:

water is an excellent liquid to use in cooling systems.

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13. Why the food does not cook properly at hilly areas?

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Topic 1 Water 2 Marks Questions

1. State three different states of water. Justify.

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2. Why does temperature in Mumbai and Chennai not fall as low as it does in Delhi?

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3. How is aquatic life benefitted by the fact that water has maximum density at $4^{o}C$?

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4. What is the use of solubility of oxygen and carbon dioxide in water?

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5. How is air dissolved in water different from ordinary air?

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6. What is the effect of dissolved impurities on freezing point of water

Watch Video Solution

7. What is the effect of impurities present in water on melting point and boiling point of water?

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Topic 1 Water 3 Marks Questions

1. Which property of water enables it to modify the climate?

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2. Density of water varies with temperature. What are its consequences ?

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3. Explain why :

Boiled or distilled water tastes flat.

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4. Explain why :

Ice at zero degree centigrade has greater cooling effect than water at $0^{\circ} C$.

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5. Explain the following:

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6. What is the importance of dissolved salts in water?

Watch Video Solution

7. Explain why: Rainwater does not leave behind concentric rings when boiled.

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8. Explain why :

Air dissolved in water contains a higher proportion of oxygen.

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9. Explain why :

If distilled water is kept in a sealed bottle for a long time, it leaves etchings on the surface of the glass.

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10. Write the important advantages of dissolved air in water.

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11. What is the effect of pressure on the boiling point and freezing point of water.

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12. Show graphically the effect of temperature on the density of water.

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Topic 1 Water 5 Marks Questions

1. Define melting point

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2. Define boiling point

Watch Video Solution

3. Specific Heat Capacity

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4. Define specific latent heat of fusion

Watch Video Solution

5. Define the following:

Specific latent heat of vaporisation:

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6. The properties of water are different from the properties of the elements of which it is formed. Discuss.

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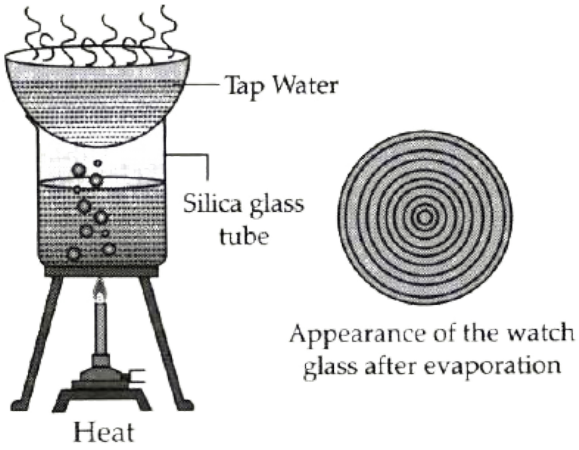
7. Look at the picture, understand the experiment and answer the below related questions :



What is the aim of the experiment?

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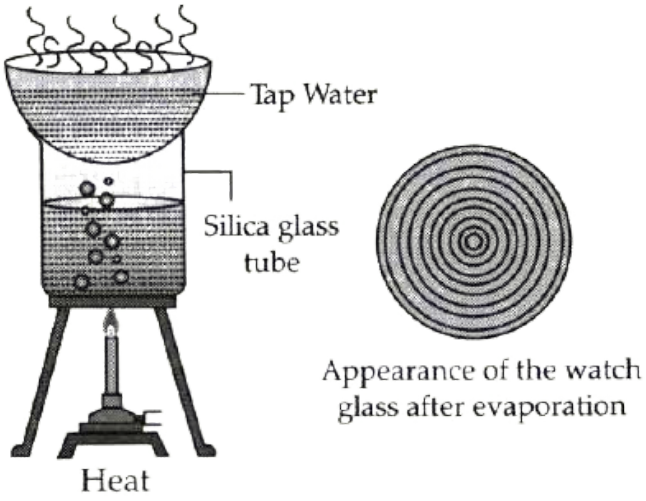
8. Look at the picture, understand the experiment and answer the below related questions :



What do you observe on the watch glass?

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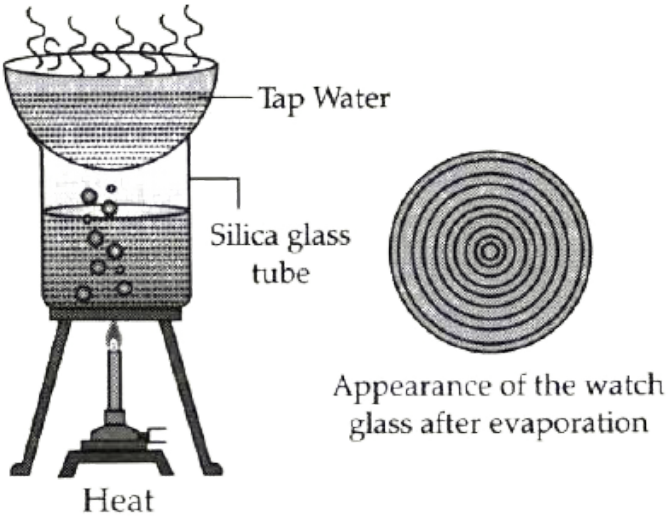
9. Look at the picture, understand the experiment and answer the below related questions :



Why does the watch glass looks the way it is shown in the diagram?

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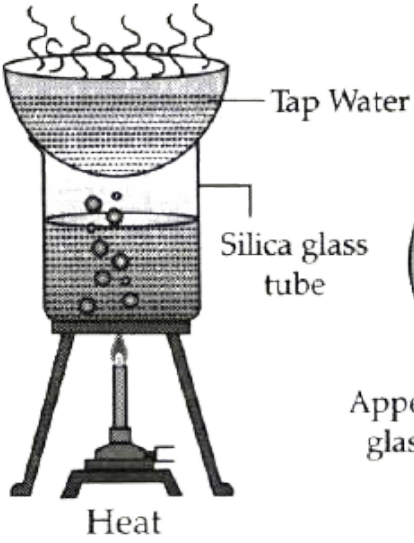
10. Look at the picture, understand the experiment and answer the below related questions :

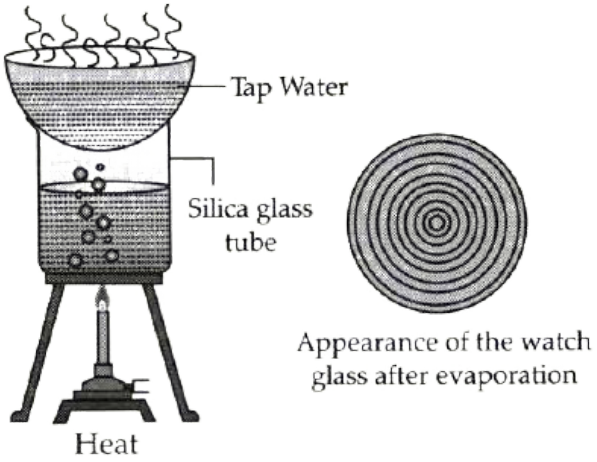


Appearance of the watch glass after evaporation

Do we see the same observation when the experiment conducted with rainwater. Why?

View Text Solution

11. Look at the picture, understand the experiment and answer the below related questions :



Give one use of the substance responsible for the observation on the watch glass.

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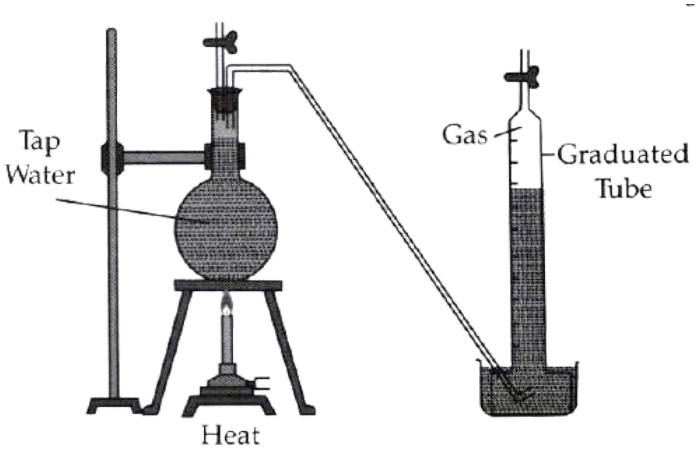
12. The given below experiment is to show tap water contains dissolved gases. Based on this, answer the below questions:



Name the method by which the gas bubbles escaping from water are collected in the graduated tube?

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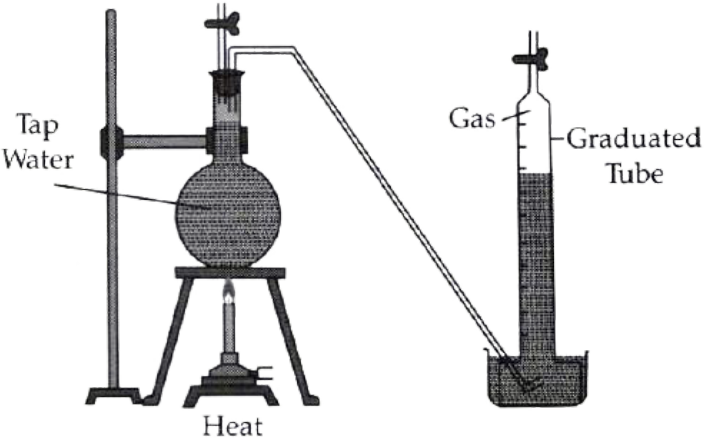
13. The given below experiment is to show tap water contains dissolved gases. Based on this, answer the below questions:



Name the quantity which tells you about the presence of dissolved gases in tap water from the experiment?

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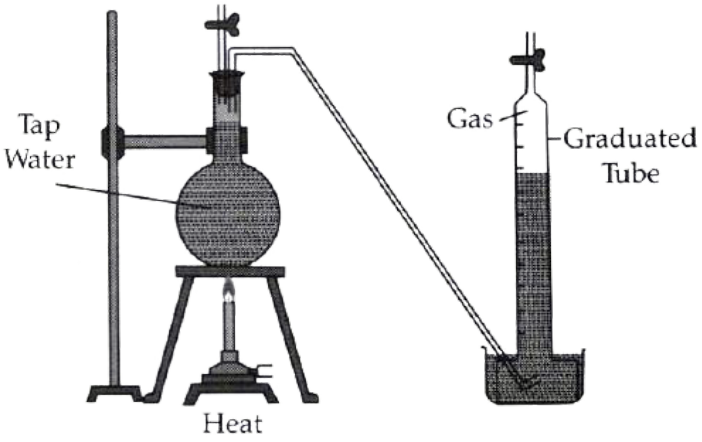
14. The given below experiment is to show tap water contains dissolved gases. Based on this, answer the below questions:



How are the gases dissolved in water can be easily expelled?

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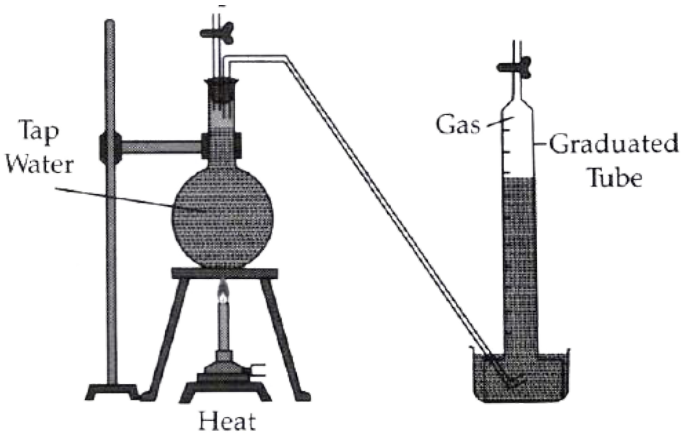
15. The given below experiment is to show tap water contains dissolved gases. Based on this, answer the below questions:



How is the dissolved oxygen in water helpful for marine life?

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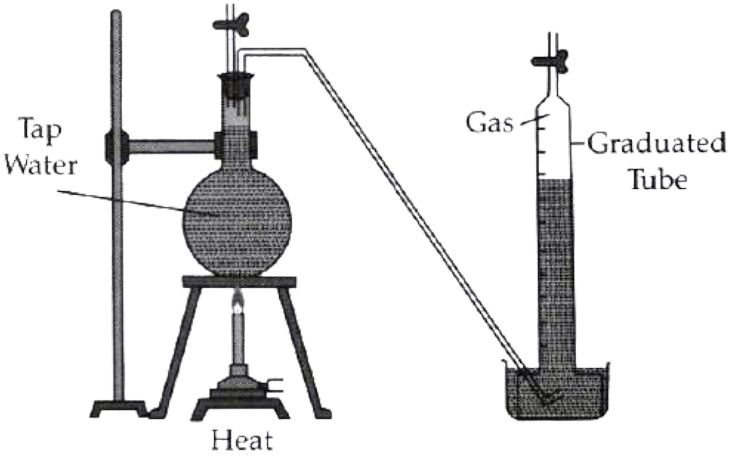
16. The given below experiment is to show tap water contains dissolved gases. Based on this, answer the below questions:



Give the composition of air dissolved in water?

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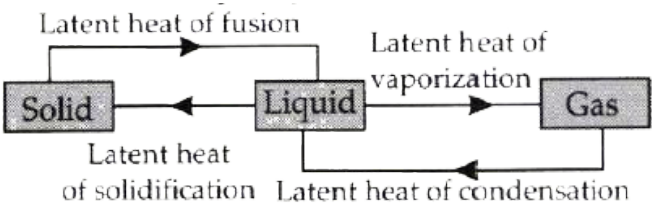
17. What information can be gained from the following diagram :



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Topic 2 Solution 1 Mark Questions

1. Which of the following has water of crystallization?

A. Potassium chloride

B. Sodium chloride

C. Sodium nitrate

D. Washing soda crystals

Answer: D

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2. With increase in temperature solubility of hydrated calcium sulphate

A. Decreases

B. Remains constant

C. Increases

D. Increases initially and then decreases

Answer: A

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3. Mass of dissolved gas by a fixed volume of liquid is directly proportional to the pressure of gas on the liquid surface. This law is:

A. Boyle.s law

B. Avogadro.s law

C. Henry.s law

D. Charles.s law

Answer: C

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4. A salt normally used in desiccator is

A. Anhydrous calcium chloride

B. Washing soda

C. Caustic soda

D. Epsom salt

Answer: A

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5. Brine is the common name of

A. Solid ammonium chloride

B. Silicon dioxide

C. Calcium phosphate

D. Sodium chloride solution

Answer: D

 Watch Video Solution

6. With the rise in temperature the solubility of sodium chloride in water :

A. Decreases

B. Increases and then decreases

C. Increases sharply

D. Increases only a little

Answer: D

 Watch Video Solution

7. A substance that does not contain water of crystallization is:

(a) Blue vitriol

(b) Common salt

(c) Glauber's salt

(d) Washing soda crystals

A. Blue vitriol

B. Common salt

C. Glauber.s salt

D. Washing soda crystals

Answer: B

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8. Match the column A with B.

Column A	Column B
(i) Dehydrating agent	A. Calcium oxide
(ii) Drying agent	B. Concentrated sulphuric acid

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9. Match the column A with B.

Column A	Column B
(i) Solution of solid with liquid	A. Dilute Solution
(ii) Solution in which amount of solute is smaller than solvent	B. Supersaturated solution
(iii) Solution in which more solute can be dissolved	C. Sugar solution
(iv) Solution that can hold more amount of solute than they do at room temperature	D. Unsaturated solution

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10. Match the column A with B.

Column A	Column B
(i) Anhydrous substance	a. Glauber's salt
(ii) Effloresecent substance	b. Nitre
(iii) Deliquescent substance	c. Ferric chloride

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11. Explain why hot saturated solution of potassium nitrate forms crystals as it cools.

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12. What is meant by binary solution ?

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13. Solubility of NaCl at $40^{\circ} C$ is 36.5 g. What is meant by this statement ?

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14. Hydrated calcium sulphate has the formula of $CaSO_4 . 2H_2O$.

What is the name given to the water molecules present in the salt ?

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15. Differentiate between the following:

(i) Efflorescence and Deliquescence

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Topic 2 Solution 2 Marks Questions

1. Table salt becomes sticky on exposure to humid air during rainy season. Explain.

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2. Give reasons for the following

Table salt absorbs moisture during the rainy season.

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3. What is the effect of temperature on solubility of KNO_3 and $CaSO_4$ in water ?

Watch Video Solution

4. Explain why : A solution is always clear and transparent.

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5. Explain why : The solute cannot be separated from a solution by filtration.

6. Explain why : Fused $CaCl_2$ or conc. H_2SO_4 is used in a desiccator.

7. Explain why : Effervescence is seen on opening a bottle of soda water.

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8. What are drying or desiccating agents. Give examples.

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9. Complete the following table :

Common Name	Washing soda	Solid caustic soda
Chemical Name		
Formula		
Acid, base or salt		
Efflorescent, hygroscopic or deliquescent substance		

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10. Complete the following table :

Common Name	Blue vitriol
Chemical Name	
Formula	
Acid, base or salt	
Efflorescent, hygroscopic or deliquescent substance	

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11. To make a saturated solution, 136 g of a salt is dissolved in 500 g of water at 293 K. Find its solubility at this temperature.

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12. 4 litres of an organic compound, acetone, is present in 90 litres of an aqueous solution. Calculate its volume percent.

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13. What is efflorescence?

Watch Video Solution

14. What do you observe when : Glauber's salt exposed to air.

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Topic 2 Solution 3 Marks Questions

1. Explain the terms:

solution

Watch Video Solution

2. Explain the terms:

solute

Watch Video Solution

3. Explain the terms:

solvent.

Watch Video Solution

4. Explain any three factors which affect the solubility of a solid solute in a solvent.

Watch Video Solution

5. If you are given some copper sulphate crystals, how would you proceed to prepare its saturated solution at room temperature? Give practical details.

Watch Video Solution

6. How can you show that your solution is really saturated ?

Watch Video Solution

7. What would you observe when crystals of copper (II) sulphate are heated in a test tube strongly?

Watch Video Solution

8. What would you observe when crystals of iron (II) sulphate are heated in a test-tube strongly?

Watch Video Solution

9. Complete the following table :

Common Name	Solid caustic potash	Quick lime	Oil of vitriol
Chemical Name			
Formula			
Acid, base or salt			
Efflorescent, hygroscopic or deliquescent substance			

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10. Give the examples of drying agents for Gases

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11. Give the examples of drying agents for Liquids

Watch Video Solution

12. Give the examples of drying agents for Solids

Watch Video Solution

13. Mention three factors that affects then solubility of a solid in a liquid.

Watch Video Solution

14. Write two difference between drying agent and dehydrating agent. Give any one example each.

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15. What is shape of following crystals?

NaCl

Watch Video Solution

16. What is shape of following crystals?

KNO_3

Watch Video Solution

17. What is shape of following crystals?

$FeSO_4$

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18. What are dilute solution and concentrated solution?

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19. Define crystallization.

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20. Classify Sodium chloride (NaCl), Fe, conc. H_2SO_4 sodium carbonate crystals based on the following characteristics when exposed to atmosphere (i) Gain in mass (ii) Loss in mass (iii) No change in mass on exposure to atmosphere

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Topic 2 Solution 5 Marks Questions

1. Normally, solubility of a crystalline solid increases with temperature. Does it increase uniformly in all cases ? Name a substance whose solubility :

increases gradually with temperature.

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2. Normally, solubility of a crystalline solid increases with temperature. Does it increase uniformly in all cases ? Name a substance

whose solubility :

increases gradually with temperature.

Watch Video Solution

3. Normally, solubility of a crystalline solid increases with temperature. Does it increase uniformly in all cases ? Name a substance whose solubility :

increases gradually with temperature.

Watch Video Solution

4. Normally, solubility of a crystalline solid increases with temperature. Does it increase uniformly in all cases? Name a substance whose solubility : initially increases then decreases with rise in temperature.

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5. Find the solubility of KNO_3 at $20^\circ C$, when the mass of the empty dish is 50 g, the mass of dish and solution is 65 g, while the mass of dish and residue is 54.3 g.

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