SOLUTIONS

Short Answers Questions
(2 Marks Each)

1. Define solute, solvent and solution?

A. **Solute:** The solute is the component which is in relatively less quantity in a solution.
Solvent: In a solution, the component which is comparatively large in quantity is called solvent.
Solution: When solute is added to solvent, the resultant homogeneous mixture is known as solution.

2. Classify the types of solution based on the solubility?

A. Based on the solubility, the solutions are divided into i) unsaturated ii) saturated iii) super saturated solutions.

3. Why copper sulphate is soluble in water, but not in kerosene?

A. We know that polar solutes are soluble in polar solvents. But not in non polar solvents.
Copper sulphate is a polar solute, water is polar solvent but kerosene is non polar solvent.
Hence copper sulphate is soluble in water but not in kerosene.

4. Common salt soluble in water but not in kerosene. Give reason?

A. Generally polar solutes are soluble in polar solvents only but not in non-polar solvents.
Common salt is a polar solute, water is a polar solvent but kerosene is a non polar solvent.
Hence common salt is soluble in water but not in kerosene.

5. Why Naphthalene soluble in Kerosene but not in water?

A. We know that non polar solutes are soluble in non polar solvents but not in polar solvents.
Naphthalene is non polar solute, Kerosene is non polar solvent but water is a polar solvent.
Hence Naphthalene is soluble in Kerosene but not in water.

6. Define weight percentage? Given its equation?

A. Weight percentage is one of the way to express concentration.
Weight Percentage: The weight of solute (in gms) present in 100 grams of solution is called weight percentage.
If a solution contains 'w' grams of solute and 'W' grams of solvent, then the weight percentage is given as follows.
Weight of solution = (w + W) grams
(w+W) grams of solution contains $\rightarrow$ w grams of solute
100 grams of solution contains $\rightarrow$?

$$\text{weight percentage} = \frac{w}{w+W} \times 100$$

Weight percentage has no units.

7. Define volume percentage? Give its equation?

A. **Volume Percentage:** The volume of solute (in ml) present in 100 ml of solution is called "volume percentage"
Let 'v' ml of solute is added to "V" ml of solvent. Then the volume percentage is given as follows.
Volume of solution = (v+V) ml
(v+V) ml of solution contain → "v" ml of solute
100 ml of solution contain → ?

$$\text{volume percentage } (V\%) = \frac{v}{v+V} \times 100$$

Volume percentage has no units.

8. Write the general volumes of the standard flasks normally used in the laboratory?

A. Standard flasks of 100 ml, 250 ml, 500 ml and 1 litre capacity are normally used in the laboratory.

9. What are "weak electrolytes"? Give some examples?

A. Substances which ionize incompletely are known as "weak electrolytes".
Eg: acetic acid (CH_3COOH)
Ammonium hydroxide (NH_4OH)

10. what are "strong electrolytes"? Give some examples?

Substances which ionize completely are known as "strong electrolytes".
Eg: NaCl, KCl, $NaNO_3$, $CaCl_2$, $FeCl_3$.

11. What are "non electrolytes"? Give some examples?

A. Substances which do not ionize are known as "non-electrolytes".
Eg: Sucrose, urea, glucose.

Very Short Answers Questions
(1 Mark Each)

1. What is aqueous solution?

A. In an aqueous solution, the solvent is water.

2. In the solution where 50 gms of alcohol is added to 50 gms of water which one is solute and which is solvent?

A. In such a case where the quantities are equal any one of the component can be called the solute and the other the solvent.

3. What is solubility?

A. **Solubility:** It is defined as the maximum amount of solute by weight in gram dissolved in 100 gm of solvent at constant temperature.

4. What is unsaturated solution?

A. **Unsaturated solution:** The solution in which the weight in grams of the solute is less than the solubility.

5. Define "saturated solution"?

A. **Definition:** A solution which remains in contact with excess of solute is said to be a saturated solution.

6. What is super saturated solution?

A. **Super saturated solution:** The solution in which the weight in grams of the solute is more than the solubility.

7. What are the factors affecting the solubility?

A. Solubility of a compound in a given solvent depends on (i) The nature of the solute and the solvent and (ii) Temperature.

8. What is the effect of temperature on solubility of gases?

A. In general the solubility of different gases decreases on increasing the temperature.

9. Define absorption coefficient?

A. **Absorption coefficient:** It is defined as the volume of gas reduced to NTP dissolved by unit volume of solvent at the temperature of experiment under a pressure of 1 atm. of the gas.

10. Define concentration of solution?

A. **Concentration:** Concentration is defined as the amount of solute present in unit volume of solution.

11. Define weight precentage?

A. "The weight of solute present in 100 gms of solution is called weight percentage"

$$\text{weight percentage} = \frac{w}{w+W} \times 100$$

12. What is standard solution?

A. **Standard solution:** A standard solution is a solution for which the concentration is known accurately.

13. What is 'ionization'?

A. The process of molecule giving rise to ions is called 'ionization'.

14. Write the effect of dilution and temperature on ionization on strong electrolytes?

A. For strong electrolytes, the effect of dilution and temperature is negligible.

15. What is the effect of dilution and temperature on weak electrolytes ionization?

A. For weak electrolytes, the dilution and temperature increases the ionization.

16. How do you increase the extent of ionisation of a weak electrolyte?

A. The extent of ionisation of a weak electrolyte can be increased by either dilution (or) by increasing the temperature.

17. Name some non-aqueous solvents?

A. Some non-aqueous solvents are Alcohol, Acetone, Benzene etc.,

Long Answer Questions
(4 Marks Each)

1. Write the properties of solution? (or) How can you say that the solution is homogeneous?

A. **Solution:** A homogeneous mixture containing two or more substances and they cannot be separated by simple techniques such as filtration is known as solution.

Properties of solution:

1) Any part of the solution will have same properties.
2) Soltutions are uniformly colourless or coloured depending on the components present in it.
3) The physical properties such as density refractive index, viscosity etc., are the same in any part of the solution. The solution is thus homogeneous.

2. Define molarity and mole fraction and give their equations?

A. **i) Molarity:** Molarity is defined as the number of moles ((or) gram moles) of a solute present in one litre of solution.

It is represented by the symbol "M"

"v" litres of solution contains $\rightarrow$ n moles of solute.

1 litre of solution contains $\rightarrow$?

$$\boxed{\text{Molarity} = \frac{n}{v} \times 1 = \frac{n}{v}}$$

But number of moles n = $\dfrac{\text{Weight of solute}}{\text{Gram Molecular Weight of solute (gm.mol.wet)}}$

Therefore

$$\boxed{\text{Molarity} = \frac{w}{\text{gm.mol.wet}} \times \frac{1}{v}}$$ (v in litres)

If volume is expressed in milli litre the above equation reduced to

$$\boxed{\text{Molarity} = \frac{W}{\text{gm.mol.wet}} \times \frac{1000}{V}}$$ (V in milli litres)

ii) Mole Fraction: Mole fraction is defined as the ratio of number of moles of a constituent to the total number of moles of all constitutents present in the solution.

Mole fraction: $\dfrac{\text{Number of moles of constituent}}{\text{Total no.of moles of all constituents present i n the solution}}$

Let n_A moles of solute 'A' be dissolved in n_B moles of solvent 'B'. Then the mole fractions of A and B are calculated as follows.

Total no. of moles in the solution = $n_A + n_B$

Mole fraction of A (X_A) = $\frac{\text{No. of moles of A}}{\text{Total no. of moles in the solution}}$

$= \frac{n_A}{n_A + n_B}$

Similarly

Mole fraction of B (X_B) = $\frac{\text{No. of moles of B}}{\text{Total no. of moles in the solution}}$

$= \frac{n_B}{n_A + n_B}$

The sum of the mole fraction of all constituents present in the solution is equal to unity.

$$X_A + X_B = \frac{n_A}{n_A + n_B} + \frac{n_B}{n_A + n_B} = 1$$

3. How do you prepare 0.1 M standard Na_2CO_3 solution?

Let us now take up for example preparation of 100 ml of 0.1 M standard solution of sodium carbonate (Na_2CO_3). The amount of sodium carbonate required to prepare this solution is calculated by using the formula.

$$\text{Molarity} = \frac{\text{Weight of the } Na_2CO_3}{\text{gram.molecular weight}} \times \frac{1}{V} \quad \text{(v in litres)}$$

$$0.1 = \frac{w}{106} \times \frac{1}{100} \times 1000$$

$$0.1 = \frac{10w}{106}$$

$$\frac{0.1 \times 106}{10} = w$$

$\therefore$ w = 1.06

For a standard solution of exactly 0.1 we need weight accurately 1.06 grams of Na_2CO_3. In practice however one weighs a known amount of sodium carbonate close to 1.06 grams and calculates the cencentration as illustrated by the following procedure.

Weigh accurately about 1 gm of anhydrous sodium carbonate in weighing bottle using an analytical balance. Let this weight be w_1 gm.

Transfer this Na_2CO_3 into a 100 ml standard flask with the help of funnel. Now weigh the empty weighing bottle. Let this weight be w_2 grams.

The difference between these two weights is equal to weight of anhydrous Na_2CO_3 viz., $(w_1 - w_2)$. Rinse the walls of the funnel with distilled water to effect quantitative transfer.

Shake gently the flask till the solid is dissolved. Make up the solution to the mark on the

flask with distilled water to effect quantitative transfer.

Shake gently the flask till the solid is dissolved. Make up the solution to the mark on the flask with distilled water. Close the flask and inverted it several time to make the solution homogeneous. This solution is taken as 0.1M standard solution.

4. Classify the following compound into strong, weak and non-electrolytes: HC*l*, $NaNO_3$, NaC*l*, acetic acid, NH_4OH; sucrose, glucose, urea, KC*l*, K_2SO_4?

A. strong electrolytes

$HCl, NaNO_3, NaCl, KCl, K_2SO_4$

weak electrolytes

acetic acid (CH_3COOH)

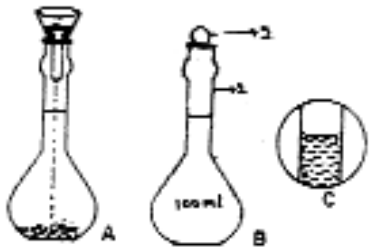
NH_4OH

non – electrolytes

sucrose, glucose

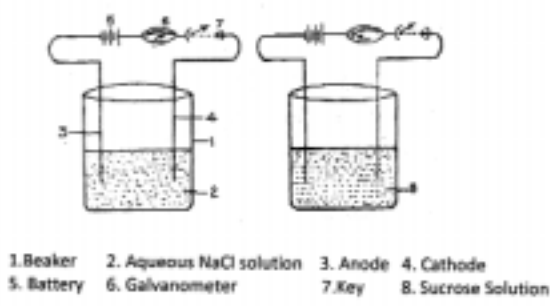
5. Draw the diagram of standard flask and mention their capacities?

A.



6. Draw a chart showing that aqueous solution of sodium chloride pass electricity whereas aqueous sucrose solution does not?

A.



PROBLEMS
(4 Marks)

1. A sample of vinegar is 2% of acetic acid and 98% of water by weight. How much vinegar must you buy in order to have 40 grams of acetic acid.

Sol: Given that

w% = 2

Weight of solute W = 40g

Weight percentage W% = $\frac{w}{w+W}\times 100$

$(w+W)=\frac{w}{W\%}\times 100$

$\therefore (w+W)=\frac{40}{2}\times 100=2000g$

Weight of the vinegar = 2000g = 2 kg

2. A solution is 4% NaOH by weight. If we require 10 grams of NaOH, how much of this solution by weight do we need?

Sol: Given

w% = 4

Weight of solute = 10g

Weight of solution = (w+W) = ?

But we know that

$w\%=\frac{w}{w+W}\times 100$

$w+W=\frac{w}{W\%}\times 100$

$=\frac{10}{\cancel{4}_{1}}\times \cancel{100}^{25}$

= 250g

Required weight of the solution = 250g

3. 20 ml of alcohol is mixed with 160 ml of water. Find out the v% of this solution.

Sol: Given

Volume of the solute (v) = 20 ml

Volume of the solvent (V) = 160 ml

We know that

Volume percentage (v%) = $\frac{v}{v+V}\times 100$

$=\frac{20}{20+160}\times 100$

$=\frac{\cancel{20}^{1}}{\cancel{180}_{9}}\times 100$

$=\frac{100}{9}$

= 11.11%

Volume percentage (v%) = 11.11

4. Calculate the number of moles of oxalic acid present in 400 ml of its 0.025 M solution.

Given

Molarity = 0.025 M

Volume in litres = $\frac{4\cancel{00}}{10\cancel{00}} = 0.4\,l$

We know that

$$\text{Molarity} = \frac{\text{No. moles of solute (n)}}{\text{Volume of solution in litres}}$$

$$0.025 = \frac{n}{0.4}$$

$\therefore$ n = 0.025 × 0.4

= 0.0100

= 0.01

$\therefore$ Number of moles of oxalic acid = 0.01

5. 6 grams of urea is present in 200 ml of its aqueous solution. Calculate the molarity of the solution (mol. wt. of urea is 60).

Sol: Given

Wt. of solute = 6g

Volume of the solution (v) = 200 ml = $\frac{2\cancel{00}}{10\cancel{00}} = 0.2\,l$

Gram molecular weight of urea = 60g

Molarity = ?

We know that

$$\text{Molarity} = \frac{\text{Wt. of solute}}{\text{Gram molecular wt. of solute}} \times \frac{1}{v}$$

$$= \frac{\cancel{6}}{\cancel{60}_{10}} \times \frac{1}{0.2}$$

$$= \frac{1}{10 \times 0.2}$$

$$= \frac{1}{2} = 0.5$$

$\therefore$ Molarity = 0.5 M

6. A gaseous mixture contains 4 grams of hydrogen (mol. wt = 2) and 168 grams of nitrogen (mol. wt = 28). Calculate the mole fractions of hydrogen and nitrogen.

Sol: Given

Weight of hydrogen = 4 grams

Gram molecular weight of hydrogen = 2

Weight of nitrogen = 168 grams

Gram molecular weight of nitrogen = 28

Mole fraction of hydrogen = ?

Mole fraction of nitrogen = ?

We know that

$$\text{Mole fraction of hydrogen} = \frac{\text{No.of moles of Hydrogen}}{\text{No.of moles of Hydrogen} + \text{No.of moles of Nitrogen}}$$

$$\text{No.of moles of hydrogen} = \frac{\text{wt.of Hydrogen}}{\text{gm.mol.wt of Hydrogen}}$$

$$= \frac{4}{2} = 2$$

$$\text{No.of moles of nitrogen} = \frac{\text{wt.of Nitrogen}}{\text{gm.mol.wt of Nitrogen}}$$

$$= \frac{168}{28} = 6$$

$$\text{Mole fraction of Hydrogen} = \frac{2}{2+6} = \frac{2}{8} = 0.25$$

$$\text{Mole fraction of Nitrogen} = \frac{6}{2+6} = \frac{6}{8} = 0.75$$

7. A solution has 3% $K_2Cr_2O_7$ and 97% of water by weight. If 100 ml of this solution weighs 1021 grams. Calculate the molarity. (Molecular weight of $K_2Cr_2O_7$ is 294)

Given

Weight percentage of $K_2Cr_2O_7$ (w%) = 3%

Weight of the solution (w+W) = 1021 grams

Molecular weight of $K_2Cr_2O_7$ = 294 g

Molarity M = ?

We know that

$$w\% = \frac{w}{w+W} \times 100$$

$$w\% = \frac{w\% \times (w+W)}{100}$$

$$w = \frac{3 \times 1021}{100} = 30.63\,\text{gm}$$

$$\text{Molarity of the solution} = \frac{\text{wt.of solute}}{\text{gram molecular wt.of solution}} \times \frac{1}{v}$$

$$v = 100\,\text{ml} = \frac{\cancel{100}}{10\cancel{00}} = \frac{1}{10} = 0.1l$$

$$= \frac{30.63}{294} \times \frac{1}{0.1}$$

$$= \frac{30.63}{29.4} = 1.04$$

∴ Molarity of the $K_2Cr_2O_7$ solution = 1.04 M

8. Identify the solutes and the solvents in the following examples.
   a) 2 grams of copper sulphate is added to 50 ml of water.
   b) 5 ml of water is added to 50 grams of magnesium sulphate.
   c) 10 grams of carbondioxide is dissolved in one litre of water to give "soda"

Sol: a) As it is less in quantity (2 grams) copper sulphate is solute and water is solvent.
b) Water is solute and magnesium sulphate is solvent.
c) Carbon dioxide is solute and water is solvent.

9. 10 grams of sodium carbonate is present in 120 grams of its aqueous solution. Calculate weight percentage?

Given
Weight of solute (w) = 10 grams
Weight of solution (w+W) = 120 grams

$$\text{Weight percentage (w\%)} = \frac{w}{w+W}\times 100$$

$$\therefore w\% = \frac{10}{120}\times 100$$

$$= \frac{100}{12} = 8.33$$

∴ Weight percentage = 8.33%

10. The weight percentage of NaC*l* solution is 10. If the weight of solution is 150 grams. Calculate the weight of NaC*l* and water?

Given
Weight percentage (w%) = 10
Weight of the solution (w+W) = 150 grams
We know that

$$w\% = \frac{w}{w+W}\times 100$$

$$10 = \frac{w}{150}\times 100$$

$$w = \frac{\overset{5}{\cancel{10}}\times \overset{3}{\cancel{150}}}{\underset{2}{\cancel{100}}} = 15$$

Weight of solvent = Weight of solution – Weight of solute
= 150 – 15
= 135 grams
∴ Weight of NaC*l* = 15 grams
Weight of water = 135 grams

11. Which of the following has maximum weight percentage?
   a) 5 gram of sodium carbonate is added to 95 grams of water
   b) 15 gram of oxalic acid is present in 150 grams of its aqueous solution.

c) 10 gm of sodium chloride is dissolved in 190 grams of water.

d) 25 gm of potassium iodide is present 400 gm of its aqueous solution.

Sol: We know that

Weight percentage (w%) = $\frac{w}{(w+W)} \times 100$

a) $w\% = \frac{5}{5+95} \times 100 = \frac{5}{100} \times 100 = 5$

b) $w\% = \frac{\cancel{15}}{\cancel{15\,0}} \times 10\cancel{0} = 1 \times 10 = 10$

c) $w\% = \frac{10}{10+190} \times 1\cancel{00} = \frac{\overset{5}{\cancel{10}}}{\cancel{2\,00}} \times 1\cancel{0}\,\cancel{0} = 5$

d) $w\% = \frac{25}{4\cancel{00}} \times 1\cancel{00} = \frac{25}{4} = 6.25$

$\therefore$ Weight percentage of solution (b) is higher.

12. 15 ml of hexane is mixed with 45 ml of heptane. Calculate the v% of this solution?

Given

Volume of hexane (v) = 15 ml

Volume of heptane (V) = 45 ml

Volume of solution (v+V) = 15+45 = 60 ml

We know that

$v\% = \frac{v}{v+V} \times 100$

$= \frac{\overset{1}{\cancel{15}}}{\underset{4}{\cancel{60}}} \times \overset{25}{\cancel{100}} = 25$

$\therefore$ Volume percentage (v%) = 25

13. A solution is formed by dissolving 'X' in alcohol. The v% of such alcoholic solution is 20. If the volume of the solution is 250 ml. Calculate the volume of alcohol and solute "X".

Sol: Given

Volume of the solution (v+V) = 250 ml

Volume percentage (v%) = 20

Let volume of the solute (X) = v

Let volume of the alcohol = V

We know that

$v\% = \frac{v}{v+V} \times 100$

$20 = \frac{v}{250} \times 100$

$$v = \frac{2\cancel{0} \times 25\cancel{0}}{1\cancel{0}\,\cancel{0}} = 50$$

$\therefore$ Volume of the solute (v) = 50 ml
Volume of the alcohol (V) = 250–50 = 200 ml

14. 2.12 grams of sodium carbonate Na_2CO_3 is present in 250 ml of its solution. Calculate the molarity of the solution (Molecular weight of Na_2CO_3 is 106)

Given
Weight of the sodium carbonate (w) = 2.12 g
Gram molecular weight of the Na_2CO_3 = 106

Volume v = 250 ml = $\frac{250}{1000} = \frac{1}{4} = 0.25\,l$

We know that

$$\text{Molarity} = \frac{w}{\text{gm.mol.wt}} \times \frac{1}{v} \qquad \text{(v in litres)}$$

$$= \frac{2.12}{106} \times \frac{1}{0.25}$$

$$= \frac{212}{106 \times 25} = 0.08$$

$\therefore$ Molarity = 0.08 M

15. Calculate the amount of oxalic acid ($H_2C_2O_4.2H_2O$) in 500 ml of 0.2 M solution (Molecular weight of oxalic acid is 126)

Given
Molarity = 0.2 M

Volume v = 500 ml = $\frac{500}{1000} = 0.5\,\text{lit}$

Molecular weight of oxalic acid = 126
Weight of the oxalic acid = (w) = ?
We know that

$$\text{Molarity} = \frac{w}{\text{gram.mol.weight}} \times \frac{1}{v} \qquad \text{(v in litres)}$$

$$0.2 = \frac{w}{126} \times \frac{1}{0.5}$$

w = 0.2 × 126 × 0.5 = 12.6 grams
Weight of the oxalic acid = 12.6 grams

16. Calculate the number of moles of NaOH present in 750 ml of o.4 M solution (Molecular weight of NaoH is 40)

Given
Molecular weight of NaOH = 40

Volume v = 750 ml = $750\,\text{ml} = \frac{750}{1000} l$

Molarity = 0.4 M

We know that

$$\text{Molarity} = \frac{\text{no. of moles}}{\text{volume}} = \frac{n}{v}$$

$$\therefore 0.4 = \frac{n}{\frac{750}{1000}}$$

$$0.4 = n.\frac{\cancel{100}^{4}\cancel{0}}{\cancel{75}^{3}\cancel{0}}$$

$$0.4 = n.\frac{4}{3}$$

$$n = 0.4 \times \frac{3}{4} = \frac{\cancel{4} \times 3}{\cancel{40}_{10}} = 0.3$$

$\therefore$ Number of moles = 0.3

17. 2 moles of sodium carbonate is dissolved in 3 moles of water. Calculate the mole fraction of sodium carbonate in water?

Given

No. of moles of sodium carbonate = 2

No. of moles of water = 3

Total number of moles = 2 + 3 = 5

We know that

Mole fraction of $Na_2CO_3 \left(X_{Na_2CO_3}\right)$

$$= \frac{\text{No. of moles of } Na_2CO_3}{\text{Total no. of moles}}$$

$$= \frac{2}{5} = 0.4$$

Mole fraction of water $\left(X_{H_2O}\right) = \frac{3}{5} = 0.6$

$$X_{Na_2CO_3} + X_{H_2O} = 0.4 + 0.6 = 1$$

18. 4 grams of NaOH (Mol. wt = 40) is dissolved in 16.2 grams of water (Mol. wt = 18). Calculate the mole fractions of NaOH and water.

Sol: Given

Weight of NaoH = 4 grams

Gram molecular weight of NaOH = 40

Weight of water = 16.2 grams

Gram molecular weight of water = 18

We know that

Number of moles of NaOH = $\frac{\text{wt. of NaOH}}{\text{gm. mol. wt of NaOH}}$

$= \frac{4}{40} = 0.1$

Number of moles of water = $\frac{16.2}{18} = 0.9$

Total no.of moles = 0.1 + 0.9 = 1

Mole fraction of NaoH (X_{NaOH}) = $\frac{\text{No. of moles of NaOH}}{\text{Total no. of moles}}$

$= \frac{0.1}{1} = 0.1$

Mole fraction of water $\left(X_{H_2O}\right) = \frac{0.9}{1} = 0.9$

Part - B
Multiple Choice
(1/2 Mark Each)

1. "Hypo" is the common name of
   a) Sodium chloride
   b) Sodium carbonate
   c) Sodium thiosulphate
   d) Sodium sulphate

2. Which of these solutions are unstable
   a) Saturated solution
   b) Un saturated solution
   c) Super saturated solution
   d) All the above

3. Which one of these compounds is more solubility?
   a) KC*l*
   b) NH_4C*l*
   c) NaC*l*
   d) $AgNO_3$

4. Which one of these compounds is least solubility
   a) $CaCO_3$
   b) $KMnO_4$
   c) NaC*l*
   d) KC*l*

5. Solubility of a substance depends on
   a) Temperature
   b) Nature of solute
   c) Nature of solvent
   d) All

6. The chemical name of sugar is
   a) Glucose
   b) Lactose

c) Fructose d) Sucrose

7. Identify the compound whose solubility remains constant
   a) Sodium Nitrate b) Sodium chloride
   c) Cerous sulphate d) Sodium citrate

8. Which of these compounds solubility decreases as the temperature increases
   a) KOH b) $NaNO_3$
   c) KNO_3 d) $Ce_2(SO_4)_3.9H_2O$

9. Identify the compound whose increase as the temperature increases
   a) KOH b) $NaNO_3$ c) KNO_3 d) All

10. Which expressing the concentration of a given solution is widely employed
    a) Weight percentage b) Volume percentage
    c) Molarity d) Mole fraction

11. Which is not the strong electrolyte solution
    a) NaCl b) KCl c) NH_4OH d) NaOH

12. Example of weak electrolyte
    a) Acetic acid b) Hydrochloric acid
    c) Nitric acid d) Sulphuric acid

13. Which of these substances do not ionize in their solution form
    a) Sucrose b) Urea
    c) Glucose d) All the above

14. 10 grams of Na_2CO_3 is dissolved in 190 grams of water. The w% of solution is
    a) 20 b) 10 c) 5 d) 2.5

15. The amount of oxalic acid (mol. wt. = 126) required to prepare 100 ml of 0.2 M solution.
    a) 1.26 g b) 2.52 g c) 5.04 g d) 0.63 g

16. Four grams of NaOH (mol. wt = 40) is dissolved in 34.2 grams of water (mol^- wt = 18). The mole fraction of NaOH is
    a) 0.1 b) 0.2 c) 0.05 d) 0.025

17. 4 ml of alcohol is dissolved in 36 ml of water. The volume percentage of solution is
    a) 10 b) 20 c) 30 d) 40

18. When 10 gm of Na_2CO_3 is present in 120 gm of aqueous solution the weight percentage
    a) $\frac{10}{120}\times 100$ b) $\frac{12000}{10}$ c) $\frac{100}{110}$ d) $\frac{1200}{100}$

19. Molecular weight of Na_2CO_3 is

a) 126 b) 106 c) 120 d) 130

20. If the solvent used to prepare a solution with water, the solution is called
a) Amalgam b) Alcoholic solution
c) Saturated solution d) Aqueous solution

21. A homogeneous mixture of two or more substance is called
a) Solute b) Solution c) Solvent d) Liquid

22. The extent of ionization increases by increase of
a) Light b) Dilution c) Concentration d) None

23. The positively charged ions when NaC*l* gets ionized is
a) Na^+ b) Cl^- c) O^{++} d) H^+

24. The compounds that are polar in nature
a) Ionic compounds b) Covalent compounds
c) Coordinate covalent compounds d) Polar covalent compounds

25. An example of polar solvent is
a) Kerosene b) Benzene c) Alcohol d) Water

KEY

1) c	2) c	3) d	4) a	5) d
6) d	7) b	8) d	9) d	10) c
11) c	12) a	13) d	14) c	15) b
16) c	17) a	18) a	19) b	20) d
21) b	22) b	23) a	24) a	25) d

Fill in the Blanks
(1/2 Mark Each)

1. The chemical name of sugar is ———
2. Solute + solvent = ———
3. ——— solution is unstable
4. Naphthalene is soluble in ———
5. The common name of sodium thiosulphate is ———
6. Ionic compounds are ——— in nature
7. Covalent compounds are ———
8. Soda is a solution of ——— in water
9. Molarity of a solution depends on ———
10. Mole fraction is ——— of temperature

11. Standard solutions are prepared in ———
12. In the preparation of standard solution solute is weighed accurately by ———
13. Concentration expressed less frequently in terms of ———
14. The current passes through a solution if it contain ———
15. If 'n' is the number of moles of solute and "v" is volume (in lit) then n/v is ———
16. On increasing the temperature the solubility of NaC*l* ———
17. Acetic acid is ——— electrolyte
18. Concentration is defined as the amount of solute present in ——— volume of solution.
19. The units of molarity are ———
20. ——— let current pass through their solution.

KEY

1) Sucrose	2) Solution	3) Super saturated
4) Kerosene	5) Hypo	6) Polar
7) Non-polar	8) Carbon dioxide	9) Temperature
10) Independent	11) Standard flask	12) Analytical balance
13) Mole fraction	14) Ions	15) Molarity
16) Does not change	17) Weak electrolyte	18) Unit
19) mol. lit^{-1}	20) Strong electrolyte	

MATCHING

Group-A		**Group-B**
1) Strong electrolyte	( )	a) Sugar
2) Weak electrolyte	( )	b) NaOH
3) Polar compound	( )	c) CH_3COOH
4) Non polar compound	( )	d) Naphthalene
5) Sucrose	( )	e) Copper sulphate
	( )	f) Salt

KEY

1-b 2-c 3-e 4-d 5-a