CBSE SOLVED TEST PAPER-02

CLASS - IX Science (Is matter around us pure)

Q. The solubility of potassium Chloride at 20 degree C is 34.7 g in 100 gm of water. The density of the solution is 1.3 g/ml. What is the w/V % of potassium chloride in the solution? Please give the explanation.

Ans: Total mass of solution = mass of KCl + mass of water = (34.7 + 100)g = 134.7g

Volume of solution = mass of solution ÷ density of solution = 134.7 ÷ 1.3 = 103.62 ml

So, w/ V% of KCl = (mass of KCl ÷ volume of solution) × 100 = (34.7 ÷ 103.62) × 100 =33.49% (w/V)

Q. The solubility of potassium chloride at 20degree celsius is 34.7g in 100g of water. The density of the solution is 1.3g m/L. What is the w/V percentage of potassium chloride in the solution?

Ans: Density = mass/volume.

Mass of solution = mass of solute (34.7) + mass of water (100) = 134.7g Density =1.3 g/L (given)

Hence 1.3 = 134.7/V. $\Rightarrow$ V = 134.7/1.3 = 103.6 L

W/V% = (34.7/103.6) x100 = 33.49%

Q. A solution is prepared by dissolving 15 g of sodium chloride in 200g of water. what is mass by mass percentage of salt in this solution

Ans: Mass of solution = 15 + 200 = 215g Mass by mass percentage of solution = ?

As we know that, Mass percentage of solution = (Mass of solute x 100) / Mass of solution

Mass by mass percentage of solution = 15×100/215 = 6.97%

Q. How much water should be required to 15 g of salt to obtain 15% of salt solution?

Ans: mass percentage of solution = (Mass of solute * 100) / Mass of solution

So putting all the values of known quantities in above formula, we get:

15 = 15×100/Mass of solution

Mass of solution = 100 g

Mass of solution = Mass of solute + Mass of solvent (water is solvent here)

Mass of water = 100-15=85 g

So 85 g of water should be required to obtain 15% salt solution.

Q. what is the amount of glucose required to prepare 250 g of 5% solution of glucose by mass?

Ans: Mass percentage of solution = (Mass of solute x 100) / Mass of solution

5 = Mass of glucose× 100/250

Mass of glucose = 12.5 g

12.5 gram of glucose is required to prepare 250 gram of 5% solution of glucose by mass.

Q. A solution contains 50 gram of sugar mixed with 150 gram of water. What is the concentration of the solution?

Ans: We know that concentration of solution= (mass of solute / mass of solution) ×100 =(50 / 200) ×100=25%

Q. Solubility of potassium nitrate at 313K is 62g. What mass of potassium nitrate would be needed to produce a saturated solution of KNO_3 in 50g of water at 313K?

Ans: Solubility is taken as the amount of solute that can be dissolved in 100g of solvent.

Thus 100g of water dissolves 62g KNO_3 Therefore 50 g of water will dissolve (62/100)x 50=31g of KNO_3.

Q. Q.1: Which separation techniques will apply for the separation of the following?

(a) Sodium chloride from its solution in water. (b) Ammonium Chloride from a mixture containing Sodium Chloride and Ammonium Chloride. (c) Small pieces of metal in the engine oil of a car.

(d) Different pigments from an extract of flower petals. (e) Butter from curd. (f) Oil from water.

(g) Tea leaves from tea. (h) Iron pins from sand.

(i) Wheat grains from husk. (j) Fine mud particles suspended in water.

Ans: (a) Crystallization or Evaporation. (b) Sublimation. (c) Centrifugation or Sedimentation. (d) Chromatography. (e) Centrifugation. (f) Separating funnel. (g) Hand-picking. (h) Magnetic separation. (i) Winnowing. (j) Centrifugation.

Explain the following giving examples:

(a) Saturated solution, (b) Pure substance, (c) Colloid, (e) Suspension.

Ans: (a) Saturated Solution - a solution in which no more of the solid (solute) can be dissolved at a given temperature is called a saturated solution. Suppose 50 gm of a solute is the maximum amount that can be dissolved in 100 gm water at 298 K. Then 150 gm of solution so obtained is the saturated solution at 298 K.

(b) Pure Substance - A pure substance consists of a single of matter or particles and can not be separated into other kind of matter by any physical process. Pure substances always have the same colour, taste and texture at a given temperature and pressure. For example, pure water is always colourless, odorless and tasteless and boils at 373 K at normal atmospheric pressure.

(c) Colloid - Colloids are heterogeneous mixtures the particle size is too small to be seen with a naked eye, but it is big enough to scatter light. The particles are called the dispersed phase and the medium in which they are distributed is called the dispersion medium. Colloids are useful in industry and daily life.

A colloid has the following characteristics:

(1) It is a heterogeneous mixture.

(2) The size of particles of a colloid lies between 1 - 100 nm and can not be seen by naked eyes.

(3) The particles of colloid can scatter a beam of light passing through it and make the path visible.

(4) The particles of colloid can not be separated from the mixture by filtration. The process of separation of colloidal particles is known as 'centrifugation'.

(5) They do not settle down when left undisturbed. In other words colloids are quite stable e.g.smoke, milk, fog, cloud etc.

(d) Suspension – A 'suspension' is a heterogeneous mixture in which the solute particles do not dissolve but remain suspended throughout the bulk of the medium.

A suspension has the following characteristics:

(1) It is a heterogeneous mixture.

(2) The size of particles of a suspension is greater than 100 nm and is visible to naked eyes.

(3) The particles of suspension can scatter a beam of light passing through it.

(4) The particles of a suspension settle down when left undisturbed.

(5) The particles of a suspension can be separated from its mixture by filtration.