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Answers Key:

5 Marks

1. **Part A**
   $FeS + 2HCl\ (dil.) \longrightarrow FeCl_2 + H_2S\uparrow$
   (A)
   Part B is not heated, so the reaction will be as such
   $Fe + 2HCL\ (dil.) \longrightarrow FeCl_2 + H_2\uparrow$
   (In part B)
   In part A, H2S gas is produced, which is identified by its characteristic smell of rotten eggs. In part B, H2 gas is produced.
   Hydrogen gas is tested by bringing a burning matchstick near the mouth of the test tube. It burns with a pop sound and water is formed.

4 Marks

2. **Homogeneous mixtures**
   (a) Solid solution. Alloys, e.g., brass, steel, bronze.
   (b) liquid solution. Sugar solution in water, seawater, alcohol in water.
   (c) Gaseous solution. Air, natural gas.
   Heterogeneous mixtures
   (a) Solid + Solid Sugar and sand, iron filings and sulphur, copper sulphate and potassium permanganate
   (b) Solid + Liquid Pastes, suspensions, etc.
   (c) Solid + gas Smok
   (d) Liquid + Liquid Milk, emulsions.
   (e) liquid + Gas Soap bubbles.
3. Various point of distinction between a chemical compound and a mixture are summarised below:

Characteristics	Pure substance or compound	Mixture
1. Composition	The elements in a compound are present in definite proportion by weight.	The ingredients of a mixture may be present in varying ratios.
2.Homogeneity	A compound is always homogeneous	A mixture may be homogeneous (solution) or heterogeneous.
3. Properties	A compound has entirely different properties from those of its constituents.	Properties of a mixture are an average of the properties of its constituents.
4. Separation	The constituents of a compound cannot be separated by simple separation techniques.	The constituents of a mixture can be separated by simple methods.
5. Energy changs	Energy in the form of heat, light, or electricity is either evolved or absorbed when a compound is formed	There is generally no energy change when a mixture is formed from its constituents.
6. volume change	At constant temperature and pressure, the formation of a compound may involve either no change or a large change in volume.	At constant temperature and pressure, the formation of a mixture involves either very little or no change in volume.

3 Marks

4. When two or more substance are mixed at random, it forms a mixture. In a mixture the constituent are not chemically combined at random and, it forms a mixture. In a mixture the constituent ate not chemically combined and can be separated into pure substances even by physical processes.Sea water is a mixture of dissolved salt and water substances even by physical processes. Sea water is a mixture of dissolved salts and water. On heating water evaporates and solid salt is left behind. The composition of a mixture can be varied and the properties of a mixture depend on its composition. For example, various types of stainless steel with distinct properties can be prepared by mixing steel with different amounts of chromium and nickel.
5. Air is a homogeneous mixture of several gases. It can be established as follows:
   (i) The amounts of gases present in air at different places varies only marginally.
   (ii) No definite formula can be assigned to air.

(iii) The different gases present in air are separable by a physical process: fractional distillation of liquid air.
(iv) The properties of air are the properties of its constituents. Air supports combustion because of oxygen present in it. Air turns lime water milky due to the presence of carbon dioxide in it.

6. (i) True Solution. A true solution is defined as a homogeneous mixture of two or more substances. The term homogeneous means that every portion of the solution has the same properties, e.g., sugar dissolved in water, iodine in ethyl alcohol (tincture).
(ii) Solute. The substance(s) present in smaller proportions in a solution is called the solute.
(iii) Solvent. The substance present in a larger in large proportion in a solution is called the solvent. If a homogeneous mixture or a solution is formed by dissolving 2 g salt in 100 g water, then salt is the solute and water is the solvent.
(iv) Solubility. The maximum amount of the solid that can be dissolved in a given amount of the solvent (water) is termed its solubility at that temperature.

7. 1.The concentration of a solution may be expressed in terms of percentage by mass of solute per 100 grams of the solution.
2. % Conc. of solution = $\frac{mass\ of\ solute}{Mas\ of\ solution} \times 100$
3. Thus, if a solution is 5%, it means it is 5 gram of a solute dissolved in 100 grams of the solution or it contains 5-gram of solute and 95 grams of solvent.
4. The concentration of a solution may also be expressed as the mass of solute dissolved in 100 cm^3 of the solution. thus, 10% sugar solution by volume means 10 g sugar dissolved in 100 cm^3 of solution.

8. Given, mass of solute = 110 g
Mass of solution = 550 g
% composition = $\frac{110}{550} \times 100$
Concentration = 20% by mass.

9. The solubility of potassium nitrate is 62 g at 313 K. it means it is the max. amount soluble at 313 K in 100 g of solution.
Amount of salt = 62 g
Amount of water = 100 - 62 = 38 g
Amount of KNO_3 in 50 g water = $\frac{62}{38} \times \frac{50}{1} = 81.58g$
The solubility of a salt increase with rise in temperature.

2 Marks

10. (a) The amount of sugar will be more because sugar is more soluble in water than salt at a given temperature.
(b) When we cool, the contents of two beakers, salt will be precipitated out first.

11. Amount of alcohol in 100 mL solution = 12 mL
Amount of water = 100 - 12 = 88 mL
88 mL water and 12 mL alcohol are to be mixed with to get 12% of alcohol.

12. (a) Mass percentage of NaCl $\frac{15}{215} \times = 6.98\ \%$
(b) Solute: Co_2; solvent Water.

13. A suspension is a heterogeneous mixture of a solid in a liquid. A suspension is formed when a liquid contains small solid particles which are not soluble in it but are visible to naked eyes. If such a mixture is left undisturbed, the solid particles slowly settle down to the bottom under the effect of gravity.If the particle size of the solid is greater than 10^{-7} meters (100 nm) and it is insoluble in the given liquid, then the solid particles remain suspended in the liquid. This is called a suspension. For example, mud water, sand water, coarse lime stone particles in water.

14. (a) The solubility of a solid in a liquid increase with rise of temperature.
(b) The particles of a solute are quite large compared to the particles of the solvent in a suspension

15. Since the mixture is homogeneous, it must b a solution. the particles of a solution are smaller than 1 nm diameter and cannot scatter beam of light.

16. (i) The particles of a solution are smaller than 10^{-9} metre in diameter. Such small particles do not scatter a beam of light passing through them. So, the path of light is not visible in a solution.
(ii) Particles of a solution are too Small, i.e., less than l nm to be seen by a naked eye.

Multiple Choice Question

17. (c) Emulsion
18. (c) When an electric current is passed through a colloidal solution, colloidal particles move towards the oppositely charged electrodes.
19. (a) aerosol
20. (a) solid
21. (b) crystallisation

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