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## SCIENCE CLASS IX

### CHAPTER-2 IS MATTER AROUND US PURE

**Q.1. State which of the following solutions exhibit Tyndall effect?**

**Starch solution, sodium chloride solution, tincture of iodine, air.**

**Ans.** Starch solution and air.

**Q.2. State one instance where water undergoes a physical change and one in which it undergoes a chemical change.**

**Ans.** Evaporation of water (physical change), Electrolysis of water (chemical change).

**Q.3. Identify homogeneous mixtures from the following**

**Soda water, soil, vinegar, unfiltered tea.**

**Ans.** Soda water and vinegar

**Q.4. Write dispersed phase and dispersed medium of emulsion.**

**Ans.** Both are liquids

**Q.5. How many elements are known to us till today?**

**Ans.** 118 elements are known, 119<sup>th</sup> element is being discovered.

**Q.6. Give two examples of suspension.**

**Ans.** Chalk powder in water and muddy water.

**Q.7. Why particles in a true solution cannot be seen with naked eyes?**

**Ans.** Particles of a true solution are very small in size (less than 1 nm), hence they are not visible.

**Q.8. List the two conditions essential for using distillation as a method for separation of the components from mixture.**

**Ans.** (i) The components (liquid) must be miscible with each other.

(ii) The components must differ in their boiling points by more than 25°C.

**Q.9. How will you justify that rusting of iron is a chemical change?**

**Ans.** Rust is totally different from iron. Iron is an element while rust is hydrated oxide of iron  $[\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}]$ . Thus, formation of rust from iron is a chemical change.

**Q.10. Give one test to show that brass is a mixture and not a compound.**

**Ans.** Melting point of brass is not definite. So it is not a compound while it is an alloy (mixture) of copper and zinc.

**Q.11. Choose the chemical change out of the following**

**Digestion of food, freezing of water, glowing of electric lamp, mixture of iron fillings with sulphur.**

**Ans.** Digestion of food.

**Q.12. How many elements are naturally occurring?**

**Ans.** There are 90 naturally occurring elements and 28 are man-made.

**Q.13. Give one example of two miscible liquids where distillation can be used for separating them.**

**Ans.** Acetone and water.

**Q.14. Which type of solution is formed when milk and water is mixed uniformly?**

**Ans.** Colloidal solution.

**Q.15.** Name the process used to obtain pure copper sulphate from impure sample.

**Ans.** Crystallisation.

**Q.16.** Write one property of colloids.

**Ans.** Tyndall effect.

**Q.17.** Which method is mostly used for the purification of solids?

**Ans.** Crystallisation.

**Q.18.** Name two metals which exist as liquids above 30°C.

**Ans.** Cesium and gallium.

**Q.19.** Salt can be recovered from its solution by evaporation. Suggest some other technique for the same.

**Ans.** Simple distillation can be used. Pure water is collected in the receiver and salt remains in the distillation flask.

**Q.20.** While diluting a solution of salt in water, a student by mistake added acetone (boiling point 56°C). What technique can be employed to get back the acetone? Justify your choice.

**Ans.** Acetone can be obtained back by simple distillation of the mixture because the difference in the boiling points of the two liquids is more than 25°C.

**Q.21.** You are given two samples of water labelled as A and B. Sample A boils at 100°C and sample B boils at 102°C. Which sample of water will not freeze at 0°C? Comment.

**Ans.** Sample B boils at  $102^{\circ}\text{C}$ . It means that it is an impure sample of water. So it will not freeze at  $0^{\circ}\text{C}$ , but freeze below  $0^{\circ}\text{C}$ . It is noticeable that pure compound (e.g., water) has a sharp melting point.

**Q.22. Why silicon and germanium are metalloid?**

**Ans.** It is because, both show properties of metals as well as non-metals.

**Q.23. What is fractionating column?**

**Ans.** It is a column packed with glass beads in which vapours cool and condense.

**Q.24. How can you separate particles of colloidal solution? Name the process.**

**Ans.** By high speed rotation of colloidal solution we can separate the particles of colloidal solution. This technique is known as centrifugation.

**Q.25. What is meant by man-made elements?**

**Ans.** The elements which are prepared in the laboratory by artificial transmutation i.e., bombarding heavy elements with smaller elements are known as man-made elements.

**Q.26. Which non-metal is liquid at room temperature?**

**Ans.** Bromine

**Q.27. Which metal is liquid?**

**Ans.** Mercury

**Q.28. What are the favourable qualities given to gold when it is alloyed with copper or silver for the purpose of making ornaments?**

**Ans.** When alloyed with copper or silver, the gold becomes harder and stronger and its brittleness decreases.

**Q.29. Four students prepared mixtures in water by taking sugar, sand, chalk powder and starch respectively, in four different test tubes. After stirring, which mixture appeared clear and transparent?**

**Ans.** Sugar and water as sugar dissolves completely into water to give a true solution (a homogeneous mixture).

**Q.30. Rohit mixed starch with water, boiled the mixture well and stirred it. What did he observe?**

**Ans.** He observed that starch forms a translucent mixture (colloid).

**Q.31. You are provided with a mixture of iron filings and sulphur powder. When you add carbon disulphide to the mixture, what would you observe?**

**Ans.** We observe that sulphur powder dissolves and the solution turns yellow.

**Q.32. In the laboratory, carbon disulphide is used as a solvent to separate a mixture of iron filings and sulphur powder. What precaution has to be taken with carbon disulphide?**

**Ans.** Carbon disulphide is always kept away from flame because it is inflammable in nature.

**Q.33. In an experiment to separate the components of a mixture of sand, common salt and ammonium chloride, which component will be removed by filtration?**

**Ans.** Sand as it is insoluble in water.

**Q.34. Tincture of iodine has antiseptic properties. How it is prepared?**

**Ans.** Tincture of iodine is prepared by dissolving iodine in alcohol.

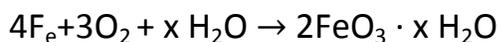


**Q.34. A student mixes white of an egg with water and stirs it well. After sometime what did he observe?**

**Ans.** He observed that a cloudy solution is formed.

**Q.35. What name is given to process of rusting of an article made up of iron and what type of change is it?**

**Ans.** The process is called corrosion and it is a chemical change because rust is a chemical compound (hydrated iron oxide,  $\text{Fe}_2\text{O}_3 \cdot x \text{H}_2\text{O}$ ) totally different from element iron. The reaction is



**Q.36. Ramu was asked to separate a mixture of common salt and ammonium chloride. Why he used sublimation to separate ammonium chloride?**

**Ans.** He used sublimation because ammonium chloride is a sublimate whereas common salt is not.

**Q.37. What type of mixtures are represented by the following?**

**(i) Carbon dioxide gas dissolved in water.**

**(ii) Air containing suspended particles.**

**(iii) Soap bubbles formed by blowing air into soap solution.**

**Ans.** (i) Homogeneous

(ii) Homogeneous

(iii) Homogeneous

**Q.38. Two miscible liquids A and B are present in a solution. The boiling point of A is  $60^\circ\text{C}$  while that of B is  $90^\circ\text{C}$ . Suggest a method to separate them.**



**Ans.** For separating A and B, simple distillation is used. When mixture is heated to  $60^{\circ}\text{C}$ , vapours of A rise in the flask, pass through condenser and collect as distillate in the receiver. Liquid B has higher boiling liquid so it remains in the distillation flask.

**Q.39.** The teacher instructed three students A,B and C respectively to prepare a 50% (mass by volume) solution of sodium hydroxide (NaOH). Student A dissolved 50g of NaOH in 100mL of water. Student B dissolved 50g of NaOH in 100g of water. The student C dissolved 50g of NaOH in water to make 100mL of solution. Which one of them has made the desired solution and why?

**Ans.** Student C has prepared the desired solution.

$$\begin{aligned}\therefore \text{Mass by volume (\%)} &= \frac{\text{Mass of solute} \times 100}{\text{volume of solution}} \\ &= \frac{50 \times 100}{100} = 50\%\end{aligned}$$

**Q.40.** Calculated the mass of potassium sulphate required to prepare its 10 per cent (mass percent) solution in 100g of water.

**Ans.**  $\text{Mass \%} = \frac{\text{Mass of solute} \times 100}{\text{Mass of solution}}$

Let the mass of potassium sulphate (solute) = x g

Then, mass of solution = (10 + x)g

Therefore  $\text{mass\%} = 10 = \frac{x \times 100}{(x+100)}$

$$1 = \frac{x \times 10}{(x+100)}$$

$$X + 100 = 10x$$

$$9x = 100$$

Or  $x = \frac{100}{9} = 9.1\text{g}$

**Q.41. Smoke and fog both are aerosols. In what way are they different?**

**Ans.** In both smoke and fog, dispersion medium is the same i.e., gas but they differ in dispersed phase.

In smoke, the dispersed phase is solid while in fog the dispersed phase is liquid.

**Q.42. Can we separate alcohol dissolved in water by using a separating funnel?**

**If yes, then describe the procedure. If not, explain.**

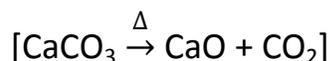
**Ans.** No, alcohol cannot be separated from water by using a separating funnel because alcohol is completely miscible in water.

**Q.43. On heating calcium carbonate gets converted into calcium oxide and carbon dioxide.**

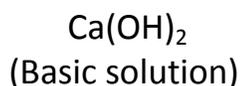
**(i) Is this a physical or a chemical change?**

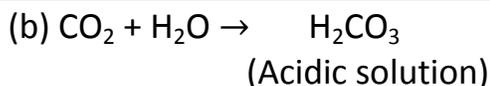
**(ii) can you prepare one acidic or one basic solution by using the products formed in the above process? If so, write the chemical equation involved.**

**Ans.** (i) The phenomena given in question is a chemical change because the composition of product formed is different from the substance taken. The reaction involved is



(ii) Yes, (a)  $\text{CaO} + \text{H}_2\text{O} \rightarrow$





**Q.44. Sucrose (sugar) crystals obtained from sugarcane and beetroot are mixed together. Will it be a pure substance or a mixture? Give reasons for the same.**

**Ans.** It is a pure substance because chemical composition of sugar crystals is same irrespective of its source.

**Q.45. Give some examples of Tyndall effect observed in your surroundings ?**

**Ans.** (i) When sunlight passes through the canopy of a dense forest.

(ii) When a fine beam of light enters a room through a small hole.

**Q.46. Suggest separation techniques one would need to employ to separate the following mixtures.**

(i) Mercury and water.

(ii) Potassium chloride and ammonium chloride.

(iii) Common salt, water and sand.

(iv) kerosene oil, water and salt.

**Ans.**(i) Decantation with the help of a separating funnel.

(ii) Sublimation

(iii) Decantation (or Filtration) followed by crystallisation.

(iv) Separating funnel is used to separate kerosene oil. Then crystallisation of the mixture to separate water and salt.

**Q.47. Explain why particles of colloidal solution do not settle down when left undisturbed, while in the case of a suspension they do?**

**Ans.** Colloidal particles are smaller in size. They remain in a state of zig-zag motion (Brownian motion) always so the forces of gravity is encountered and they do not settle down. But the particles in suspension are larger in size, so they settle down under the influence of gravity.

**Q.48. Classify the following as physical or chemical properties.**

**(i) The composition of a sample of steel is 98% iron, 1.5% carbon and 0.5% other elements.**

**(ii) Zinc dissolves in hydrochloric acid with the evolution of hydrogen gas.**

**(iii) Metallic sodium is soft enough to be cut with knife.**

**(iv) Most metal oxides form alkalis on interacting with water.**

**Ans.** (i) Physical            (ii) Chemical  
(iii) Physical            (iv) Chemical

**Q.49. Classify the following as elements and compounds.**

**(i) Silver**

**(ii) Methane**

**(iii) Water**

**(iv) Mercury**

**Ans.** Silver and mercury  
Methane and water

**Q.50. Name the technique used to separate**

**(i) dyes in blue-black ink**

**(ii) camphor and sand**



(iii) different gases from air

(iv) butter from cream

Ans. (i) Chromatography

(ii) Sublimation

(iii) Fractional distillation

(iv) Centrifugation

**Q.51. A solution made by dissolving 50 g of glucose in 250 g of water, calculate the concentration of this solution in mass percentage.**

Ans. Mass percentage

$$= \frac{\text{Mass of glucose}}{\text{Mass of glucose} + \text{Mass of water}} \times 100$$

$$= \frac{50}{50+250} \times 100$$

$$= \frac{50}{300} \times 100$$

$$= \frac{50}{3}$$

$$= 16.66\%$$

**Q.52. A child eats chocolate and digests it. In doing so, some physical and chemical changes take place. Identify the changes.**

Ans. Physical change Breaking of chocolate into small pieces.

Chemical change Digestion of chocolate.

**Q.53. (i) A mixture is prepared by mixing two liquids A and B Which property will be used to separate them by the process of distillation?**

**(ii) Name the process for separating the component of a mixture containing sand, salt and ammonium chloride.**

**Ans.** (i) Difference in their boiling points.

- (ii) (a) Sublimation to remove  $\text{NH}_4\text{Cl}$   
(b) Dissolution in water of remaining mixture.  
(c) Filtration to remove sand  
(d) Evaporation of filtrate to get salt.

**Q.54. Define a solution. Give an example of**

**(i) gas in liquid solution**

**(ii) gas in gas solution.**

**Ans.** Solution is homogeneous mixture of two or more substances, e.g., salt in water.

- (i)  $\text{CO}_2$  dissolved in water  
(ii) Air

**Q.55. What is meant by a saturated solution? What happens when a saturated solution is heated?**

**Ans.** In saturated solution no more amount of solute can be dissolved. When it is heated, it becomes unsaturated.

**Q.56. Define sublimation. Name two solids that sublime on heating.**

**Ans.** It is the process where a solid changes directly into vapours without going in liquid state. e.g., iodine, ammonium chloride, camphor etc.



**Q.57.** A solution contains 40 g of common salt in 360 g of water. Calculate the concentration in terms of mass by mass percentage of the solution.

**Ans.** Mass percentage

$$\begin{aligned} &= \frac{\text{Mass of solute}}{\text{Mass of solute} + \text{Mass of solvent}} \times 100 \\ &= \frac{40}{40 + 360} \times 100 \\ &= \frac{40}{400} \times 100 = 10\% \end{aligned}$$

**Q.58.** Four different mixtures in water are prepared using charcoal powder, chalk powder, slaked lime and detergent powder. Which of these

(i) Would not leave residue on filter paper after filtration?

(ii) Would show Tyndall effect?

(iii) Would leave residue on filter paper after filtration.

(iv) Would give transparent / clear solution

**Ans.** (i) Detergent solution and slaked lime solution, (called lime water) will not leave any residue on filter paper after filtration.

(ii) Detergent solution will show Tyndall effect

(iii) Charcoal powder and chalk powder will leave residue on filter paper.

(iv) Slaked lime will give transparent / clear solution

**Q.59.** Common salt is obtained from seawater and purified before sending it for marketing.

(i) Name the process by which common salt is obtained from seawater.

(ii) Name the process by which common salt is purified.

**Ans.** (i) Common salt is obtained from seawater by evaporation.

(ii) Common salt obtained from sea is purified by crystallisation.

**Q.60. Give reasons**

**(i) Path of beam of light is not visible through a solution.**

**(ii) Particles of suspension can be seen with a naked eye.**

**Ans.** (i) Path of beam of light is not visible through a true solution because particles of a true solution do not scatter light while colloidal particles scatter light.

(ii) Size particles of suspension is greater than 100nm. So, they can be seen with a naked eye.

**Q.61. Explain why filter paper cannot be used to separate colloids.**

**Ans.** The size of colloidal particles is less than 100 nm while the size of pores present in an ordinary filter paper is larger than 100 nm. Hence, a colloidal solution cannot be separated by filtration.

**Q.62. On dissolving chalk powder in water, a suspension is obtained. Give any four reasons to support the fact that mixture so obtained is a suspension only.**

**Ans.** It is supported by the following reasons.

- (i) White particles of chalk powder can be seen with naked eye.
- (ii) The particles can be separated by ordinary filter paper.
- (iii) Upon shaking a white turbidity reappears in solutions.
- (iv) Light cannot pass through the suspension which show that it is of opaque nature.

**Q.63. Write any two applications of chromatography. Also write a necessary condition of chromatography.**

**Ans.** Applications of chromatography are

- (i) To separate pigments from natural colours.
- (ii) To separate drugs from blood.

It is based on the principle that different components dissolve in same solvent to different extent.