



**CHAPTER 2**  
**PURE SUBSTANCES AND MIXTURES**

**SOLUTIONS**

*Textual Questions (Page No. 23)*

**Q.1. What are homogeneous and heterogeneous mixtures?**

**Ans:** A mixture which has uniform composition throughout and no visible boundaries between the constituents is known as **homogeneous mixture**.

E.g. Salt or Sugar dissolved in water.

**Heterogeneous mixture** is a mixture which has varying constituent particles and visible boundaries between the various constituents.

E.g. Mixture of sugar and sand, mixture of petrol and water etc.

**Q.2. How are the size of particles in a solution, colloid and suspension different from each other?**

**Ans:** The size of particles in a solution is less than 1mm in diameter whereas the size of particles of a colloid is between 1nm and 100nm and the size of particles in a suspension is larger than 100nm in diameter and can be seen with naked eye.

**Q.3. Bring out the differences between sol, aerosol foam and emulsion**

**Ans:** Differences between sol, aerosol and emulsion:

<b>DIFFERENCES</b>		
<b>Types of colloid</b>	<b>Dispersed phase</b>	<b>Dispersion medium</b>
Sol	Solid	Liquid
Liquid aerosol	Liquid	Gas
Solid aerosol	Solid	Gas
Foam	Gas	Liquid
Emulsion	Liquid	Liquid



*Textual Question (Page No. 30)*

**Q.1. How will you separate a mixture of common salt and sand?**

**Ans:** The mixture of common salt and sand is dissolved in water. The solution mixture is filtered to remove sand. When the filtrate is evaporated common salt is obtained again.

**Q.2. What process will be used to get camphor from a mixture of camphor and common salt?**

**Ans:** Sublimation will be used to get camphor from a mixture of camphor and common salt.

**Q.3. Name the method used to separate a mixture of chalk powder and water.**

**Ans:** Filtration.

**Q.4. How can cream be separated from milk?**

**Ans:** Cream can be separated from the milk by centrifugation. Cream particles being lighter are found at the top.

**Q.5. Name the process by which common salt is obtained from sea water?**

**Ans:** Evaporation.

**Q.6. How can common salt be purified?**

**Ans:** Common salt can be purified by the technique of crystallization.

**Q.7. Name the process by which mixture of dyes can be separated from their mixtures.**

**Ans:** Chromatography.

**Q.8. How will you separate water and mustard oil?**

**Ans:** The mixture of water and mustard oil is put inside a separating funnel. The two components form separate layers. Oil being lighter forms the top layer and water forms layer below it. BY opening the stop cock water is poured out in another container and thus separated from oil.

**Q.9. What types of mixtures are separated by the process of fractional distillation?**

**Ans:** Fractional distillation is used to separate two or more miscible liquids for which boiling point difference is less than  $30^{\circ}\text{C}$ .



*Textual questions (Page No. 32)*

**Q.1. Name the process by which we get new substances?**

**Ans:** Chemical change.

**Q.2. What is the essential condition for a substance to undergo change in chemical composition?**

**Ans:** The essential condition for a substance to undergo chemical change is that it should lose its identity and form new substance.

**Q.3. Classify the following changes as physical or chemical:**

- i) Decay of vegetables
- ii) Formation of clouds
- iii) Burning of candle

**Ans:**

- i) Decay of vegetables - chemical change
- ii) Formation of clouds – Physical change
- iii) Burning of candle – chemical change

**Q.4. How can you say that whether or not a chemical change takes place when**

- i) Milk turns sour
- ii) Iron changes into iron rust

**Ans:**

- i) The milk becomes sour in taste when the sugar molecules present in the milk are converted into lactic acid. So, this is a chemical change.
- ii) Iron turns into rust when a new substance called hydrated iron oxide is formed. So this is a chemical change.

*Textual Questions (Page 37)*

**Q.1. Explain why the following are examples of physical changes:**

- i) Mixing of iron and sulphur
- ii) Boiling of water

**Ans:**

- i) Mixing of iron and sulphur does not form new substance when water is added to the mixture, sulphur floats and iron settle at the bottom. So this is a physical change.
- ii) When water is boiled, it is converted into vapour and on cooling down, water is obtained. So boiling of water is a physical change.

**Q.2. Why the following are examples of chemical changes:**

- i) Charring of sugar
- ii) Burning of charcoal
- iii) Digestion of food.

**Ans:**

- i) Charring of sugar leads to the formation of a black powdery substance which is a new substance. So, this is a chemical change.
- ii) Burning of charcoal forms carbon dioxide and water. As charcoal is changed in composition, this is a chemical change.
- iii) Digestion of food is a chemical change because enzymes in stomach and intestine break down the large food particles (macro molecules) into simpler substances.



**Q.3. What is meant by saying metals are malleable and ductile?**

**Ans:** Metals are malleable means that metals can be beaten into sheets and ductile means they can be drawn into wires.

**Q.4. Name one solid, one liquid and one gaseous non-metal.**

**Ans:**  
Solid Non-metal – Carbon  
Liquid non-metal – Bromine  
Gaseous non-metal – Chlorine.

**Q.5. Classify the following into elements, compounds and mixtures:**

**Graphite, brass, chalk, air, petroleum, sea-water, milk, sodium bicarbonate, zinc.**

Elements	Compounds	Mixture
Graphite	Chalk	Brass
Zinc	Sodium bicarbonate	Air
		Sea water
		Milk
		Petroleum

**Q.6. List three characteristics by which compounds can be distinguish from mixtures.**

**Ans:**

Compound	Mixture
1.Elements react and combine together to form compounds	1.Elements and compounds mix together but no new substance is formed.
2.A compound has specific elements combined in a fixed proportion and show different properties from that of the constituents	2.A mixture has variable composition and show the properties of its constituents
3.A compound has a fixed melting and boiling points.	3.A mixture does not have a fixed melting and boiling points.

**Textual Questions (Page No.38)**

**Q.1. What is sublimation? Give the differences between evaporation and sublimation.**

**Ans:** Sublimation is the process of changing a solid directly into gaseous state on heating and vapour turns into solid on cooling.

Evaporation	Sublimation
i) Evaporation is the process in which a liquid or solvent changes into gaseous state on heating	i) This is the process of changing a solid into a gaseous state on heating and vice versa on cooling
ii) This process is used to separate a volatile component(liquid) from a non-volatile component of a mixture.	ii) This process is used to separate volatile solid from its mixture.



**Q.2. What are distillation and fractional distillation?**

**Ans:** Distillation is a technique used for the separation of components of a mixture containing two miscible liquids that have a boiling point difference of more than  $30^{\circ}\text{C}$ .  
Fractional distillation is a technique used to separate a mixture of two or more miscible liquids which have a boiling point difference of less than  $30^{\circ}\text{C}$ . This technique is used in the separation of petroleum products.

**Q.3. What separation technique will you use to separate the following:**

- Common salt from sea water
- Sand and water
- Iodine from a mixture of Iodine and Sodium chloride
- different colouring materials from an extract of flower petals
- Butter from milk
- Hydrated copper sulphate from its aqueous solution
- Powder chalk and sugar
- Iron pins and sand
- Oil from water

**Ans:**

The following techniques are used for the above mixtures

Mixture	Technique/process
a) Common salt from sea water	Evaporation
b) Sand and water	Sedimentation and decantation
c) Iodine from a mixture of Iodine and Sodium	Sublimation
d) different colouring materials from an extract of flower petals	Chromatography
e) Butter from milk	Centrifugation
f) Hydrated copper sulphate from its aqueous solution	Crystallization
g) Powder chalk and sugar	Filtration and evaporation
h) Iron pins and sand	By using magnet
i) Oil from water	By using separating funnel.

**Q.4. Name three commercial materials obtained from petroleum and state the method used to obtain them.**

**Ans:** Three commercial materials obtained from petroleum are:

- (i) Gasoline or Petrol
- (ii) Petroleum gas
- (iii) Lubricating oil

The method used is **fractional distillation**.



**Q.5. What is a pure substance? Give three examples each of the two classes of pure substances.**

**Ans:** A pure substance is a form of matter which cannot be separated into other kinds of matter by any physical process. Based on chemical composition, there are two types of pure substances

Elements – eg. Hydrogen, Oxygen, Nitrogen

Compounds – eg. Common salt, Copper sulphate and water

**Q.6. Give the main classification of elements. Mention at least two examples of each type.**

**Ans:** Elements can be classified as

<b>i) Metals</b>	<b>ii) Non-metals</b>	<b>ii) Metalloids</b>
Eg. Gold, Silver	Eg. Sulphur, Oxygen,	Germanium, Arsenic

**Q.7. Give two evidences to show that water is a compound.**

**Ans:** Two evidences to show that water is a compound are

- Water cannot be separated into its constituents – Hydrogen and Oxygen by any physical process.
- Water contains Hydrogen and Oxygen in a fixed proportion of 1:8.

**Q.8. Explain with examples:**

**a) Saturated solution**

**b) Colloid**

**c) Suspension**

**d) Physical changes**

**Ans:**

**(a) Saturated solution:** A solution which can dissolve no more of the solute at a given temperature is called a saturated solution. E.g. 100gm of water can dissolve 35g of common salt at room temperature.

**(b) Colloid:** A Colloid is a heterogeneous system and size of particles of a colloid is between 1nm and 100nm in diameter [ $1\text{nm} = 10^{-9}\text{m}$ ]. Colloids can scatter a beam of light through it. E.g. Sol, jellies.

**(c) Suspension:** It is a heterogeneous mixture in which small particles of a solid are spread throughout a liquid without dissolving in it. The particles of suspension are larger than 100nm in diameter and are visible to our naked eye.

E.g. suspension of chalk powder in water

**(d) Physical changes:** These are the changes in which the physical properties such as texture, shape, size and state of the substances are changed but their internal composition remains the same.e.g., change of liquid water into solid ice.

**(e) Chemical changes:** These are the changes that results in the formation of new substances which are entirely different from that of the original substance.

E.g. Rusting of iron





**Q.9. Classify the following as elements, compounds and mixtures –**

Tap water, distilled water, sugar point, filtered tea, air, copper, iodine, wood, soil, soda water

**Ans:**

<b>Element</b>	<b>Compound</b>	<b>Mixture</b>
Copper	Distilled	Air
Iodine	Sugar	Filtered tea
		Soil
		Tap water
		Soda water.

**Q.10. Which of the following fall in the category of a pure substance?**

a) Iron b) Wood c) Mercury d) Brick e) Ice f) Air g) Milk

**Ans:** Out of the given substances the following fall in the category of a pure substance – Iron, Mercury, Ice and Carbon-dioxide.

**Q.11. What is Tyndall effect? Which of the following will show Tyndall effect?**

a) Sugar solution b) Copper sulphate c) Starch solution d) Potassium permanganate solution

**Ans:** When a beam of light is allowed to pass through the colloidal dispersion, the beam of light is illuminated. The scattering of light by the colloidal particles is known as Tyndall effect.

Out of the given solutions, starch solution shows Tyndall effect.

**Q.12. Classify the following into physical and chemical changes –**

- a) Burning of incense stick
- b) Sublimation of camphor
- c) Digestion of food
- d) Glowing of electric bulb
- e) Rusting of iron.

**Ans:**

a) Burning of incense stick	–	Chemical change.
b) Sublimation of camphor	–	Physical change.
c) Digestion of food	–	Chemical change.
d) Glowing of electric bulb	–	Physical change.
e) Rusting of iron	–	Chemical change.



**PROBABLE QUESTIONS FORM TEXT BOOK**

**Q1. Write three point of differences between homogeneous mixture and heterogeneous mixtures**

**Ans :-**

<b>DIFFERENCES</b>	
<b>Homogeneous mixture</b>	<b>Heterogeneous mixture</b>
<b>1.</b> Homogeneous mixture has a uniform composition throughout.	<b>1.</b> Heterogeneous mixture has varying composition throughout.
<b>2.</b> It has no visible boundaries of separation between the various constituents.	<b>2.</b> It has visible boundaries of separation between the various constituents.
<b>3.</b> They consist of single phase and have same properties throughout the bulk.	<b>3.</b> They consist of two or more phase and have different properties throughout the bulk.

**Q2. What are the properties characteristics of colloidal solution?**

**Ans:-** Properties of colloidal solutions:

- (i) The size of the solutes (colloids) is in between 1nm to 100nm.
- (ii) It is heterogeneous system.
- (iii) They can scatter light and makes its path visible.
- (iv) They do not settle down when kept undisturbed and can pass through filter paper.

**Q3. What is colloidal solution?**

**Ans:-** A solution whose size of the solute is in between 1nm to 100 nm is called colloidal solution.

**Q4. What are dispersed phase and dispersion?**

**Ans:- Disperse phase:** It is the component of the colloidal solution which is present in small proportion and consist of particles of colloidal dimension.

**Dispersion medium:** It is the component of the colloidal solution which is present in excess and acts as a medium in which colloidal particles are dispersed.

**Q5. What is the principle of centrifugation?**

**Ans:** The Principle of centrifugation technique is that when the mixture is rotated rapidly, the heavier particles are forced to the bottom and the lighter particles stay at the top and they can be separated by decantation process.

**Q6. Define Sublimation. Give example of two substances which can easily occur by sublimation.**

**Ans:** The process of changing of a solid particle into gaseous state without liquefaction on heating and vice versa is known as sublimation.

**e.g.** Camphor, Naphthalene





**Q7. Why is crystallization technique is better than simple evaporation technique?**

**Ans:** In crystallization technique pure form of the substance can be recovered from the solution. Some impurities may remain dissolved in the solution after filtration. On evaporation these impurities contaminate the solid.

**Q8. What is Joule Thomson Effect or Joule – Kelvin effect?**

**Ans:** The phenomenon of producing lowering of temperature when a gas is made to expand suddenly from the region of low pressure is known as Joule Thomson effect or Joule or Joule – Kelvin effect.

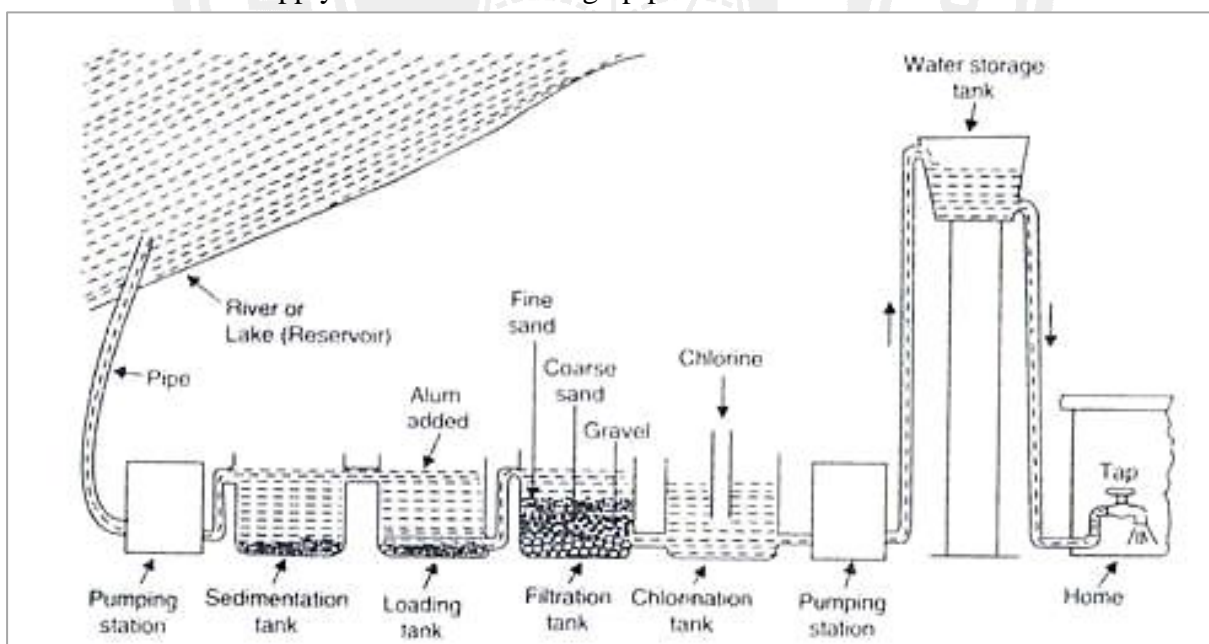
**Q9. Describe the purification of water for human consumption.**

**Or**

**How is water purified for human consumption?**

**Ans:** River water is pumped and sent to the large sedimentation tank through pipe lines in which coarse suspended impurities get settled at the tank. From the sedimentation tank, water is sent to loading tank and added alum to coagulate colloidal particles. They settle down at the bottom of the tank which carries most of the suspended organic matters including living organisms.

The water is then passed through filter tank of remove suspended materials that fails to settle out. The clear water is then passed into the disinfecting or chlorination tank to added small quantities of chlorine to destroy harmful organisms. This purified water is then stored in large overhead tanks for supply to the homes through pipeline.



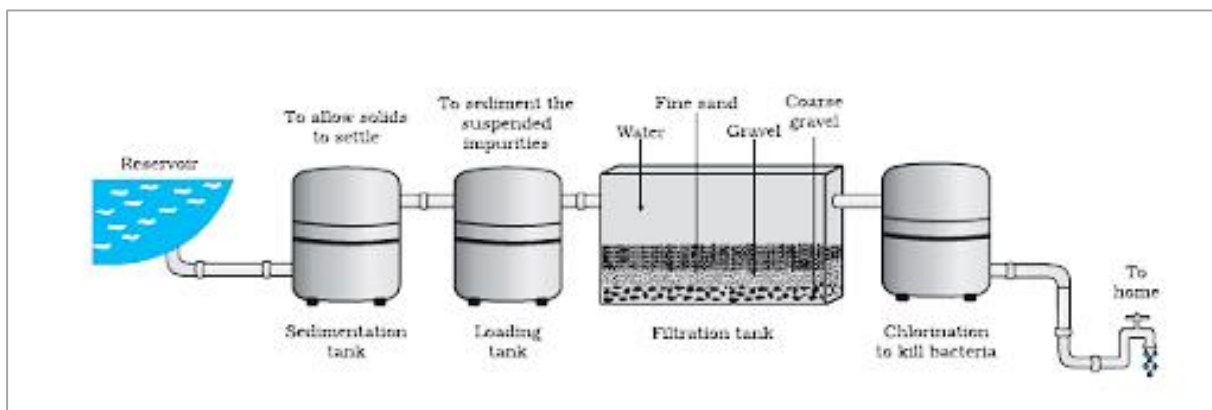


Fig. Schematic diagrams for supply of drinking water

**Q10. Who purpose the definition of element? Write the purpose definition.**

**Ans:** Robert Boyle purpose the definition of elements.

**Definition:** A pure substance which cannot be split up into anything else by physical and chemical processes is known as element.

**Q11. Give the name of a metal and non-metal which exist in liquid state at room temperature.**

**Ans:** Metal → Mercury

Non-Metal → Bromine

**Q12. Give the name of a non-metal which can conduct electricity.**

**Ans:** Carbon in the form of graphite.

**Q13. What are compounds and mixtures?**

**Ans:** Those substances which are formed by two or more elements chemically combined with one another in a fixed proportion are known as compounds.

Those substances which are formed by two or more elements or compounds which are not chemically combined and have their own properties are known as mixture.

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