

Very Short Answer Type Questions

[1 mark]

Q. 1. How can you change a saturated solution to an unsaturated solution without adding any more solute to it?

Ans. By heating the saturated solution, it becomes unsaturated.

Q. 2. 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.3. Based on which factor a solution is said to be diluted, concentrated or saturated?

Ans. solution is said to be diluted, concentrated or saturated on the basis of the amount of solute dissolved in the solution.

Q. 4. Identify solute and solvent in 'tincture of iodine'.

Ans. Iodine is the solute and alcohol is the solvent.

Q. 5. What is mass per cent of a solution?

Ans. It is defined as the mass in grams of the solute present in one hundred grams of a solution.

Q. 6. What are the two components of a colloidal solution?

Ans. The two components of a colloidal solution are dispersed phase and dispersing medium.

Q. 7. In what respect does a true solution differ from a colloidal solution?

Ans. A true solution is homogeneous whereas a colloidal solution is heterogeneous.

Q. 8. Two liquids 'A' and 'B' are miscible with each other at room temperature. Which separation technique will you apply to separate the mixture of 'A' and 'B' if the difference in their boiling points is 27°C?

Ans. We can separate miscible liquids by fractional distillation, if both the liquids have difference in their boiling points, So, the mixture of liquids 'A' and 'B' can be separated by fractional distillation.

Q. 9. Define crystallisation.

Ans. It is a process that separates a pure solid in the form of its crystals from a solution.

Q. 10. Why is crystallisation technique considered better than simple evaporation to purify solids?

Ans. Crystallisation is considered better than simple evaporation because

(i) some solids decompose or get charred on heating to dryness.

(ii) some impurities may remain dissolved in the solution even after filtration. On evaporation, these contaminate the solid.

Q. 11. Why is water called universal solvent?

Ans. Water is known as universal solvent because it has the ability to dissolve wide variety of substance.

Q. 12. Which of the following are physical changes?

Melting of iron metal, rusting of iron, bending of iron rod, drawing a wire of iron metal.

Ans. Melting of iron metal, bending of iron rod and drawing a wire of iron metal are physical changes because there is no change in the chemical composition of iron, only its form is changing.

Q. 13. Name two elements which exist in liquid state at room temperature.

Ans. Gallium and mercury exist in liquid state at room temperature.

Q. 14. An unknown substance A' on thermal decomposition produces 'B' and C'. What is 'A'-an element, a compound or a mixture?

Ans. Unknown substance A' should be a compound because elements and mixture do not decompose.

Q. 15. Identify the elements from the following substances: sulphur, brine, hydrochloric acid, water, neon, paper, sugar.

Ans. The elements are sulphur and neon.

Ans. Distillation is used to get back acetone. We know that boiling point of water is 100°C and since acetone is more volatile it will separate out first.

Q. 9. Define chromatography and give its one application.

Ans. Chromatography is a technique used for the separation of a mixture of solutes brought about by distribution of dissolved material between two immiscible phases, one of which is mobile phase and the other part is stationary phase. It is useful in forensic science to detect and identify trace amounts of substances in the contents of bladder or stomach.

Q. 10. Rain water stored in a tank contains sand grains, unfilterable clay particles, calcium carbonate, salt, pieces of paper and some air bubbles. Select from amongst these one example each of a solvent, a solute, a colloid and a suspension.

Ans. Solvent – water
Solute – salt
Colloid - air bubbles
Suspension -clay particles

Q. 11. Classify the following as physical or chemical properties:

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

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

(c) Metallic sodium is soft enough to be cut with a knife.

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

Ans. Physical properties-(a) and (c)
Chemical properties-(b) and (d)

Q. 12. Give two points of differences between an element and a compound

Ans.

Element	Compound
1. An element is made up of same kind of atoms.	1. A compound is obtained from different kinds of atoms.
2. An element cannot be split by physical or chemical methods.	2. A compound can be split into new substances by chemical methods.

Q. 13. Which of the following are not compounds?

- (a) Chlorine gas (b) Potassium chloride
(c) Iron (d) Iron sulphide

- (e) Aluminium
- (f) Iodine
- (g) Carbon
- (h) Carbon monoxide
- (i) Sulphur powder

Ans. Chlorine gas, iron, aluminium, iodine, carbon, sulphur powder.

Q. 14. Is water an element or a compound? Give reason in support of your statement.

Ans. Water is a compound because of the following reasons:

(i) It is composed of two different elements, hydrogen and oxygen which cannot be separated by physical methods. They can be separated only by electrolysis.

(ii) The physical and chemical properties of hydrogen and oxygen are entirely different from the properties of water.

Short Answer Type Questions – II

[3 marks]

Q. 1. Identify the dispersed phase and dispersing medium in the following colloids.

(a) Fog (b) Cheese (c) Coloured gemstone

Ans. (a) Fog-liquid, gas

(b) Cheese-liquid, solid

(c) Coloured gemstone--solid, solid

Q. 2. Describe any three properties of colloid.

Ans. (i) It is a heterogenous mixture.

(ii) Size of particles is too small to be seen by naked eye.

(iii) They scatter light passing through them making its path visible.

(iv) They do not settle down when left undisturbed.

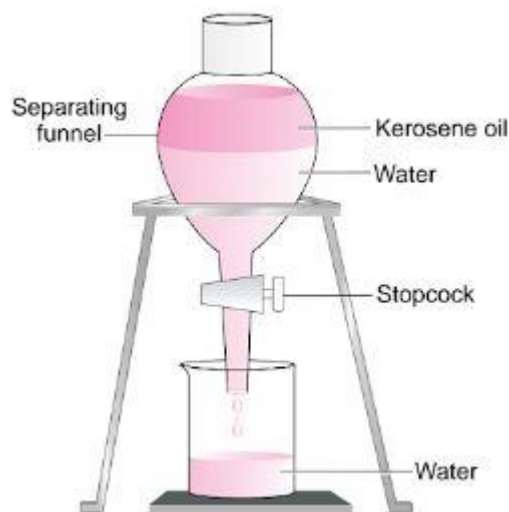
(v) They cannot be separated by the process of filtration. *(any three points)*

Q. 3. State the principle of separating two immiscible liquids by separating funnel. Describe an activity with diagram to separate a mixture of water and kerosene oil.

Ans. Immiscible layers separate out in layers depending on their densities in separating funnel.

Activity to separate kerosene oil from water using a separating funnel:

- Pour the mixture of kerosene oil and water in separating funnel as shown in figure.
- Let it stand undisturbed for sometime so that separate layers of oil and water are formed.
- Open the stopcock of the separating funnel and pour out the lower layer of water carefully.
- Close the stopcock of the separating funnel as the oil reaches the stopcock.



Q. 4. What would you observe when

(a) a saturated solution of potassium chloride prepared at 60°C is allowed to cool at room temperature?

- (b) an aqueous sugar solution is heated to dryness?**
(c) a mixture of iron filings and sulphur powder is heated strongly?

Ans. (a) Solid potassium chloride will separate out.
 (b) Initially the water will evaporate and then sugar will get charred.
 (c) Iron sulphide will be formed.

Q. 5. Suggest separation technique (s) one would need to employ to separate the following mixtures:

- (a) Mercury and water**
(b) Potassium chloride and ammonium chloride
(c) Common salt, water and sand
(d) Kerosene oil, water and salt.

Ans. (a) Separation by using separating funnel
 (b) Sublimation
 (c) Filtration to separate sand followed by evaporation/distillation
 (d) Separation by using separating funnel to separate kerosene oil followed by evaporation or distillation.

Q. 6. Name the process associated with the following:

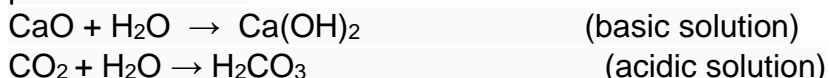
- (a) Dry ice is kept at room temperature and at one atmospheric pressure.**
(b) A potassium permanganate crystal is in a beaker and water is poured into the beaker with stirring.
(c) An acetone bottle is left open and the bottle becomes empty.
(d) Milk is churned to separate cream from it.
(e) Settling of sand when a mixture of sand and water is left undisturbed for some time.
(f) Fine beam of light entering through a small hole in a dark room, illuminates the particles in its paths.

Ans. (a) Sublimation (b) Dissolution/diffusion
 (c) Evaporation/diffusion (d) Centrifugation
 (e) Sedimentation (f) Scattering of light (Tyndall effect).

Q. 7. On heating, calcium carbonate gets converted into calcium oxide and carbon dioxide.

- (a) Is this a physical or a chemical change?**
(b) Can you prepare one acidic and one basic solution by using the products formed in the above process? If so, write the chemical equation involved.

Ans. (a) Chemical change.
 (b) Acidic and basic solutions can be prepared by dissolving the products of the above process in water.



Q. 8. Non-metals are usually poor conductors of heat and electricity. They are non-lustrous, non-sonorous, non-malleable and are coloured.

(a) Name a lustrous non-metal.

(b) Name a non-metal which exists as a liquid at room temperature.

(c) The allotropic form of a non-metal is a good conductor of electricity. Name the allotrope.

(d) Name a non-metal which is known to form the largest number of compounds.

(e) Name a non-metal other than carbon which shows allotropy.

(f) Name a non-metal which is required for combustion.

Ans. (a) Iodine (b) Bromine

(c) Graphite (d) Carbon

(e) Sulphur (f) Oxygen

Q.9. Classify the following into metals, non-metals and metalloids:

(i) Germanium (ii) Boron

(iii) Diamond (iv) Iodine

(v) Copper (vi) Helium.

Ans. Metal - Copper

Non-metals - Diamond, iodine and helium

Metalloids - Germanium, boron.

Q. 10. Classify the following into elements, compounds and mixtures.

(i) Pure sand (ii) Air

(iii) Ammonia gas (iv) Ice

(v) Glass (vi) CaO.

Ans. Elements - Nil

Compounds - Pure sand, Ice, CaO, Ammonia gas

Mixture - Air, Glass.

Long Answer Type Questions

[5 marks]

Q. 1. Differentiate between a true solution and a colloid.

Ans.

True solution	Colloid
<p>1. A true solution is a homogeneous mixture of two or more substances.</p> <p>2. The size of the particles is less than one nanometer.</p> <p>3. It is always transparent.</p> <p>4. The particles cannot be seen even with microscope.</p> <p>5. It does not show Tyndall effect.</p>	<p>1. A colloidal solution is a heterogeneous mixture of two substances.</p> <p>2. The range of particle size is between one nanometer to 1000 nanometer.</p> <p>3. It is translucent.</p> <p>4. The particles of a colloidal solution can be seen with microscope.</p> <p>5. It shows Tyndall effect.</p>

Q. 2. Distinguish between physical change and chemical change.

Ans.

Physical change	Chemical change
<p>1. In a physical change, only physical properties such as colour, physical state, density, volume, etc. change; chemical properties remain unchanged.</p> <p>2. No new substance is formed in a physical change.</p> <p>3. Very little or no energy in the form of heat, light or sound is usually absorbed or given out in a physical change.</p> <p>4. A physical change is a temporary change.</p> <p>5. The original form of substance can be regained by simple physical methods.</p> <p>6. A physical change is reversible.</p>	<p>1. In a chemical change, the chemical composition and chemical properties undergo a change.</p> <p>2. A new substance is formed in a chemical change.</p> <p>3. A chemical change is always accompanied by absorption or evolution of energy.</p> <p>4. A chemical change is a permanent change.</p> <p>5. Original substance cannot be obtained by simple physical methods.</p>

	6. A chemical change is irreversible.
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Q. 3. Distinguish between metals and non-metals.

Ans.

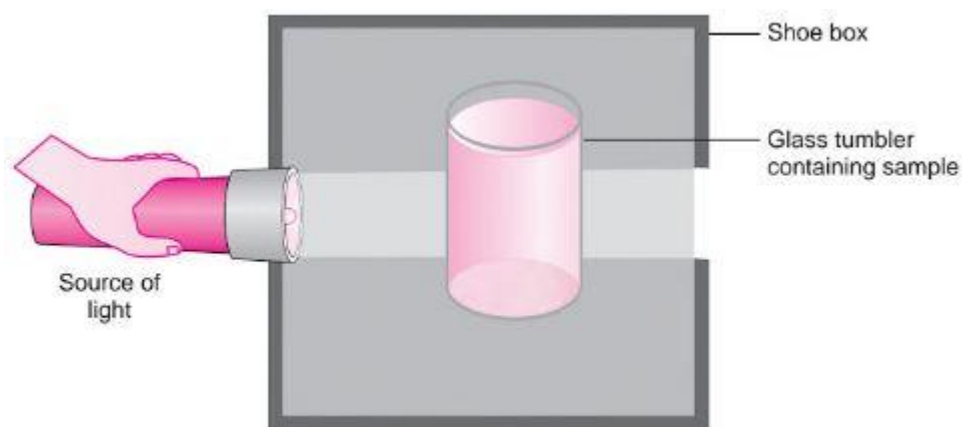
Metals	Non-metals
1. They have lustre (sheen).	1. They are non-lustrous (dull).
2. They are malleable and ductile.	2. They are neither malleable nor ductile.
3. They have high density and high melting and boiling points.	3. They have low density and low melting and boiling points.
4. Except mercury and gallium, all other metals are solid at room temperature.	4. Non-metals may exist in solid, liquid or gaseous states at room temperature.
5. They are sonorous.	5. They are not sonorous.
6. They are good conductors of heat and electricity.	6. They are poor conductors of heat and electricity.
7. They are generally hard (except sodium and potassium).	7. Non-metals are generally soft (except diamond).
8. They have high tensile strength.	8. They have low tensile strength.

Q. 4. Distinguish between compounds and mixtures.

Compounds	Mixtures
<p>1. Compounds are formed as a result of chemical reactions between two or more elements or Compounds.</p> <p>2. The components of a compound are always present in a definite ratio by mass.</p> <p>3. The properties of a compound are entirely different from its constituents.</p> <p>4. Compound are always homogeneous in nature.</p> <p>5. Compound formation is accompanied by absorption or evolution of light, heat or electrical energy.</p> <p>6. Melting and boiling points of a compound are usually sharp and fixed.</p> <p>7. The constituents of a compound cannot be separated by physical or mechanical means. They can, however, be separated by chemical methods.</p>	<p>1. Mixtures are formed by simply mixing two or more constituents. There are no chemical reactions between the constituents.</p> <p>2 The components of a mixture may be present in any ratio.</p> <p>3. The properties of a mixture are same as those of its constituents.</p> <p>4. Mixtures are usually heterogeneous (except in solutions).</p> <p>5. Heat, light or electrical energy may not be evolved or absorbed during the formation of a mixture.</p> <p>6. Melting and boiling points of a mixture are usually not sharp and fixed.</p> <p>7. The components of a mixture can be easily separated by physical methods.</p>

Q. 5. A group of students took an old shoe box and covered it with a black paper from all sides. They fixed a source of light (a torch) at one end of the box by making a hole in it and made another hole on the other side to view the light. They placed a milk sample contained in a beaker/tumbler in the box as shown in the figure. They were amazed to see that milk taken in the tumbler was illuminated. They tried the same activity by taking a salt solution but found that light simply passed through it.

(a) Explain why the milk sample was illuminated. Name the phenomenon involved.



(b) Same results were not observed with a salt solution. Explain.

(c) Can you suggest two more solutions which would show the same effect as shown by the the milk solution?

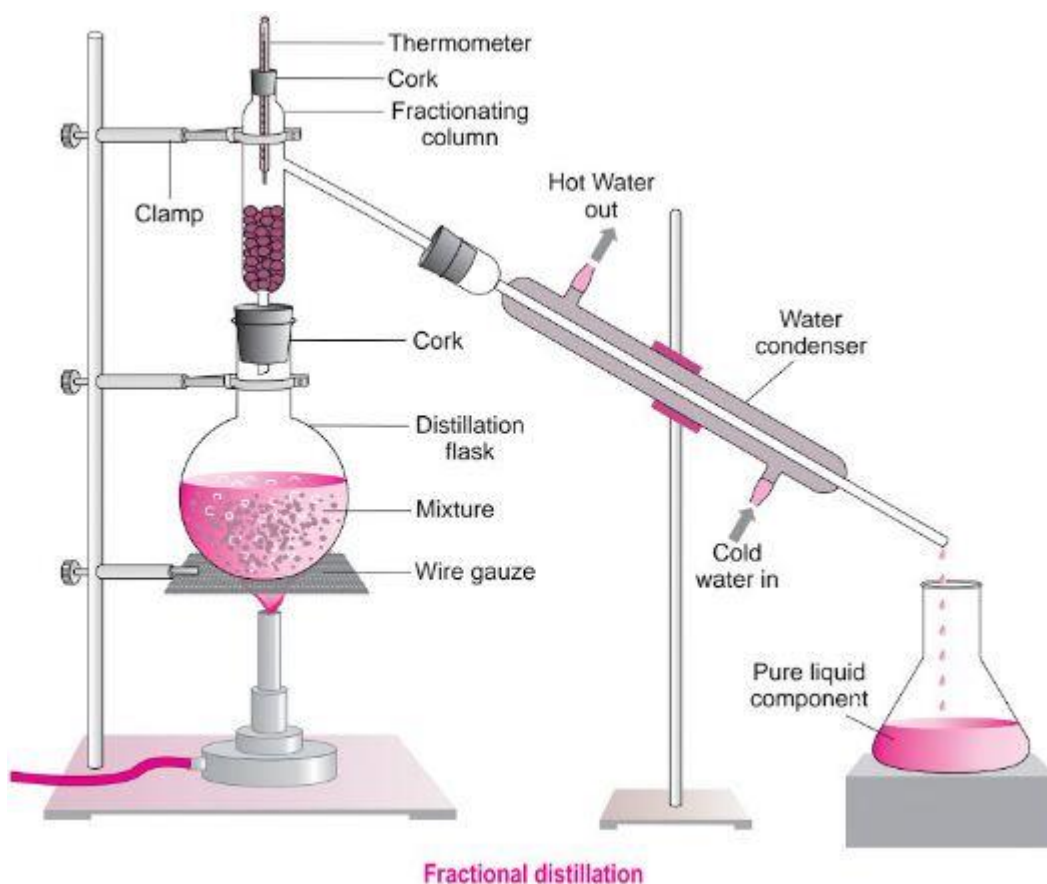
Ans. (a) Milk is a colloid. If a beam of light is put on a milk sample contained in a beaker, the path of light beam is illuminated and becomes visible when see from the other side. This is because the colloidal particles are big enough to scatter light falling on them. This scattered light enters our eyes and we are able to see the path of light beam. The scattering of light by colloidal particles is known as Tyndall effect.

(b) Salt solution is a true solution. If a beam of light is put on a salt solution kept in a beaker in a dark room, the path of light beam is not visible inside the solution when seen from the other side. This is because salt particles present in it are so small that they cannot scatter light rays falling on them.

(c) Detergent solution, sulphur solution.

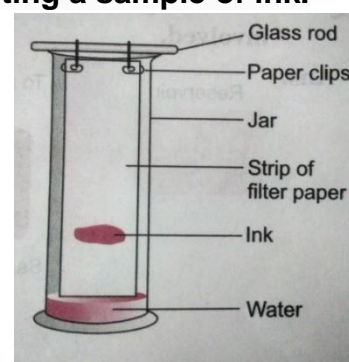
Q.6. Fractional distillation is suitable for separation of miscible liquids with a boiling point difference of about 25 K or less. What part of fractional distillation apparatus makes it efficient and possess an advantage over a simple distillation process? Explain using a diagram.

Ans. The fractionating column packed with glass beads provides a surface for the vapours to collide and lose energy so that they can be quickly condensed and distilled. Also, length of the column would increase the efficiency of separation.



Q.7. A child wanted to separate the mixture of dyes constituting a sample of ink. He marked a line by the ink on the filter paper and placed the filter paper in a glass containing water as shown in figure. The filter paper was removed when the water moved near the top of the filter paper.

- (i) What would you expect to see, if the ink contains three different coloured components?**
(ii) Name the technique used by the child.
(ii) Suggest one more application of this technique.



Ans. (i) The colour component which is more soluble in water dissolves first, rises faster and produces a colour band (spot) on the paper at a higher position. The less soluble colour components dissolve a little later, rise slower and form coloured bands at lower heights. In this way, three different bands will be observed.

(ii) Chromatography

(iii) To separate the pigments presents in chlorophyll.

Q. 8. You are provided with a mixture containing sand, iron filings, ammonium chloride and sodium chloride. Describe the procedures you would use to separate these constituents from the mixture.

Ans. (i) Removing iron filings from the mixture by magnetic separation. Take the mixture in a petri dish and roll a bar magnet over it. Iron filings will get attached to the magnet and thus separate from the mixture.

(ii) Removing ammonium chloride by sublimation

Transfer the remaining mixture into a China dish and heat it. On heating, ammonium chloride sublimes and solidifies on condensation. The mixture containing sand and sodium chloride is left behind in the China dish.

(iii) Removing sand by filtration

Make a solution of sand and sodium chloride in water. Filter the solution. Sodium chloride will dissolve in water and sand is left as residue on the filter paper.

(iv) Evaporate the filtrate to dryness to get sodium chloride or by crystallisation.

Q. 9. Classify each of the following as a physical or a chemical change. Give reasons.

(a) Drying of a shirt in the sun.

(b) Rising of hot air over a radiator.

(c) Burning of kerosene in a lantern.

(d) Change in the colour of black tea on adding lemon juice to it.

(e) Churning of milk cream to get butter.

Ans. (a) It is a physical change because water is converted from its liquid state to gaseous state because of the sun's heat.

(b) It is a physical change because water in the radiator is converted from a liquid state to gaseous state.

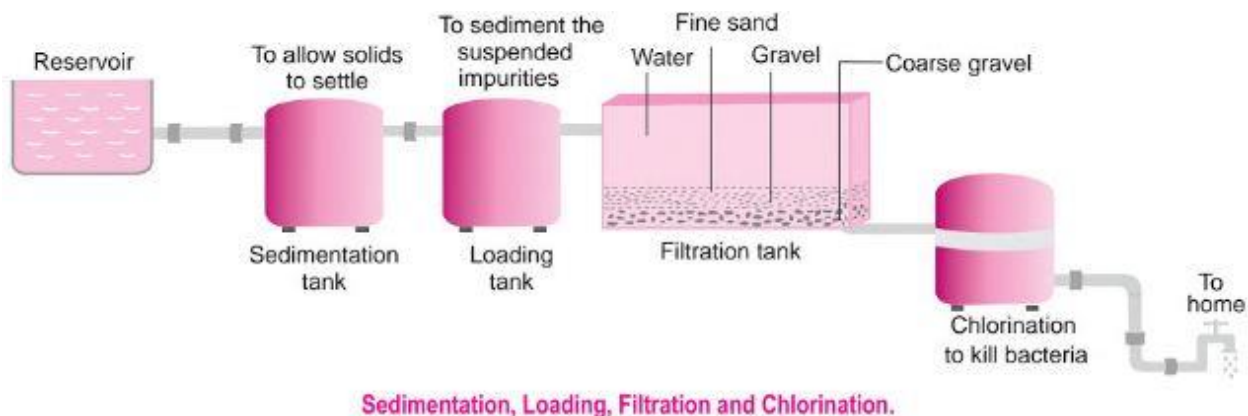
(c) It is a chemical change because combustion of kerosene occurs and new products are formed.

(d) It is a chemical change because there is a reaction between the citric acid in the lemon and the compounds of tea resulting in formation of new products.

(e) It is a physical change because the cream suspended in the milk is separated by churning.

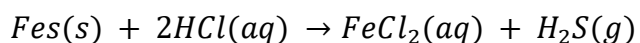
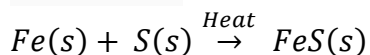
Q. 10. Show diagrammatically how water is purified in the waterworks system and list the processes involved.

Ans.



Q. 11. Iron filings and sulphur were mixed together and divided into two parts 'A and S, Part A, was heated strongly while Part 'S' was not heated. Dilute hydrochloric acid was added to both the parts and evolution of gas was seen in both the cases. How will you identify the gases evolved?

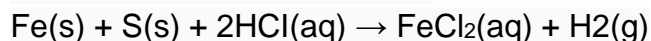
Ans. Part A



Part B

$Fe(s) + S(s) \rightarrow$ Mixture of iron filings and sulphur

When dilute HCl is added to it



Sulphur remains unreacted.

H_2S gas formed has a foul smell and on passing through lead acetate solution, it turns the solution black. Hydrogen gas burns with a pop sound.

HOTS (Higher Order Thinking Skills)

Q. 1. (a) Under which category of mixtures will you classify alloys and why?

(b) A solution is always a liquid. Comment.

(c) Can a solution be heterogeneous?

Ans. (a) Alloys are homogeneous mixture of two or more elements because the constituent elements mix together and give a mixture which uniform together.

(b) No, solid solutions and gaseous solutions are also possible.

Examples are brass, air.

(c) No, a solution cannot be heterogeneous in nature.

Q. 2. The teacher instructed three students 'A' 'B' and 'C' respectively to prepare a 50% (mass by volume) solution of sodium hydroxide (NaOH). 'A' dissolved 50 g of NaOH in 100 mL of water to make 100 mL of solution. Which one of them has made the desired solution and why?

Ans. 'C' has made the desired solution because 50% (mass by volume) solution means 50 g of solute dissolved in 100 mL of solution.

$$\begin{aligned}\text{Mass by volume per cent} &= \frac{\text{Mass of solute}}{\text{Volume of solution}} \times 100 \\ &= \frac{50}{100} \times 100 = 50\% \text{ mass by volume.}\end{aligned}$$

Q. 3. Explain why filter paper cannot be used to separate colloids.

Ans. The size of colloidal particles is less than 1nm, while the size of pores present in an ordinary filter paper is large than 1nm. Hence, a colloidal solution cannot be separated by filtration

Q. 4. Three student A, B and C prepared mixture using chalk powder, common salt and milk respectively in water. Whose mixture:

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

(ii) would show Tyndall effect?

(iii) would give transparent/clear solution?

(iv) would settle down at the bottom when left undisturbed?

(v) could be filtered by filter paper?

Ans. (i) (a) Mixture of common salt and water.

(b) Mixture of milk and water.

(ii) Mixture of chalk powder with water and milk with water

(iii) Mixture of common salt and water.

(iv) Mixture of chalk powder and water.

(v) Mixture of chalk powder and water.

Q. 5. Can we separate alcohol dissolved in water by using a separating funnel? If yes, then describe the procedure. If not, explain.

Ans. We cannot separate alcohol dissolved in water by using separating funnel because both the components are highly soluble in each other. They can be separated by fractional distillation.

Q. 6. What is the reason for running cold water through condenser from lower side to upper side in distillation process?

Ans. In distillation process condensation of vapors takes place. To absorb more heat, cold water is passed from lower side so that it will stay for longer time and absorb more heat from the vapors to form liquid state of the substance.

Q. 7. You are given two samples of water labeled 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' will not freeze at 0°C because it is not pure water. At 1 atm, the boiling of pure water is 100°C and the freezing point of pure water is 0°C.

Value Based Questions

1. While chopping vegetables Sushila's mother accidentally injured her fingers due to which she began bleeding profusely. Sushila immediately applied alum on the cut part (wound). The bleeding stopped after some time.

(i) Mention the value shown by Sushila in the above case.

(ii) What is the role of alum used in the above case?

Ans. (i) Presence of mind, knowledgeable.

(ii) Alum acts as a coagulant and helps in stopping bleeding.

2. Anil and Roshan went to a restaurant to have dinner. Anil picked up the glass of water to drink but he immediately kept it back. He said, "The water was not fit for drinking."

Based on the above information answer the questions that follow:

(i) What could be the reason of it?

(ii) How could have been the water made fit for drinking? Name the process.

(iii) Which values are promoted by the restaurant people here?

Ans. (i) Heavy suspended particles might be floating in the water served for drinking.

(ii) Water could have been made fit for drinking by adding alum to the water. The heavy particles of dissolved alum deposit on the finer suspended particles. The suspended particles become heavy and settle down at the bottom of the tank. This process is known as sedimentation.

(iii) Ignorance, carelessness, unhygienic conditions.

3. In a hill station a group of tourists were going for a short tour by a jeep. The driver was repeatedly wiping the glass of front window as there was obstruction of view.

Answer the following questions based on the information given above.

(i) Why there was obstruction in view?

(ii) What precaution should be taken by the driver in the hilly area?

(ii) Write any two properties of it.

Ans. (i) The obstruction in view was due to formation of a mixture known as smog created by smoke and fog, present in the atmosphere.

(ii) The driver should move in a slow pace with front lights on.

(iii) Smog is a mixture known as suspension.

Characteristics:

(i) The particle size in suspensions ranges from 10^{-3} cm to 10^{-5} cm.

(ii) The particles of suspension do not pass through filter paper.