

	INDIAN SCHOOL AL WADI AL KABIR	
Class: IX	Department: SCIENCE 2026 – 27 SUBJECT: SCIENCE(CHEMISTRY)	Date: 18/08/2026
Worksheet No: 02 WITH ANSWERS	CHAPTER / UNIT: CHAPTER-5-EXPLORING MIXTURES AND THEIR SEPARATION PART-2	Note: A4 FILE FORMAT
CLASS & SEC:	NAME OF THE STUDENT:	ROLL NO.

I. OBJECTIVE TYPE QUESTIONS (1 MARK):

- Which method is most suitable for separating two miscible liquids whose boiling points differ by more than 25°C?
 - Sublimation
 - Crystallization
 - Distillation
 - Fractional distillation
- Which of the following mixtures will exhibit the Tyndall effect?
 - Salt and water
 - Sugar and water
 - Copper sulfate and water
 - Milk and water
- Brass is made by combining copper and zinc uniformly. How should brass be classified?
 - Heterogeneous mixture
 - Homogeneous mixture
 - Pure substance
 - Suspension
- The process where a solid directly changes into vapour upon heating is:
 - Deposition
 - Evaporation
 - Sublimation
 - Coagulation
- What happens to the solubility of a solid solute in a liquid solvent as the temperature increases?
 - It decreases
 - It increases
 - It remains the same
 - It first increases then decreases
- What is the particle size of a solute in a true solution?
 - Greater than 1000 nm
 - Between 1 nm and 1000 nm
 - Less than 1 nm
 - Exactly 100 nm

7. A mixture contains chalk powder, common salt and water. Which combination of methods will give the best separation?
 - (a) Filtration followed by evaporation
 - (b) Evaporation followed by filtration
 - (c) Sublimation followed by filtration
 - (d) Distillation followed by sublimation
8. Two miscible liquids have boiling points of 85°C and 100°C. Which method is most appropriate for separating them?
 - (a) Separating funnel
 - (b) Filtration
 - (c) Fractional Distillation
 - (d) Sublimation

For the following questions, two statements are given-one labelled Assertion (A) and the other labelled Reason(R). Select the correct answer to these questions from the options (i) , (ii), (iii) and (iv) as given below:

- A) Both A and R are true, and R is the correct explanation of the Assertion.
 - B) Both A and R are true, but R is not the correct explanation of the Assertion.
 - C) A is true, but R is false.
 - D) A is false, but R is true.
9. Assertion (A): Fractional distillation is used to separate components of air.
Reason (R): The boiling points of gases in air have very small differences (less than 25°C).
 10. Assertion (A): Crystallization is a suitable method for obtaining pure copper sulphate crystals from its solution.
Reason (R): Crystallization is used only for separating liquids from liquids.
 11. Assertion (A): A mixture of common salt and water cannot be separated by filtration.
Reason (R): Common salt is completely dissolved in water and therefore passes through the filter paper along with water.

II.VERY SHORT QUESTIONS (2 MARKS):

12. What is the principle behind centrifugation? Mention one of its applications in medical diagnostics.
13. Define an alloy. Why can't the components of an alloy be separated by physical methods?
14. Name the two components of a colloid. How is an emulsion defined in this context?
15. Explain the process of coagulation and the role of alum in purifying muddy water.

III. SHORT ANSWER QUESTIONS (3 MARKS):

16. You are given a mixture of three substances: common salt, sand, and ammonium chloride. Devise a sequence of three different separation techniques to obtain each substance in its pure form. Justify the order of your steps.
17. Why is crystallization considered a better technique than simple evaporation for obtaining pure sugar from its solution?

18. Clouds are described as mixtures of water droplets or ice crystals in air. Based on the properties of mixtures, classify clouds as a solution, suspension, or colloid, and justify your answer based on the Tyndall Effect.
19. While performing paper chromatography, a student notices the solvent level is above the ink spot at the start. Predict the result of this error and explain the correct procedure.
20. Two miscible liquids, A and B, are present in a mixture. The boiling point of A is 60°C and the boiling point of B is 90°C . Suggest a method to separate them. Also, draw a neatly labelled diagram of the method suggested.

IV. LONG ANSWER TYPE QUESTIONS (5 MARKS):

21. Blood is an example of a colloidal mixture. (i) What would happen if blood behaved like a true suspension inside the body? (ii) In a blood sample, identify the dispersed phase and the dispersion medium.
22. Explain Fractional Distillation with the help of a labelled diagram. Why is it preferred over simple distillation for refining crude oil?
23. Describe an experiment using a separating funnel to separate mustard oil from water. Include the reason why these liquids form layers.
24. Compare the effectiveness of filtration and crystallization as separation techniques for homogeneous and heterogeneous mixtures. Use the examples of muddy water and copper sulfate solution to explain why filtration is insufficient for purifying a dissolved salt, whereas crystallization succeeds.

V. SOURCE BASED/CASE BASED QUESTION (4 MARKS):

25. Blood is often described as a life-saving fluid. In laboratories, doctors use a machine to spin blood at high speeds to separate its components.
 - (a) Which separation technique is being used?
 - (b) Identify the "lighter liquid" that remains at the top after spinning.
 - (c) Is blood a solution, suspension, or colloid? Justify.

OR

(c) Why is this process essential for medical tests?

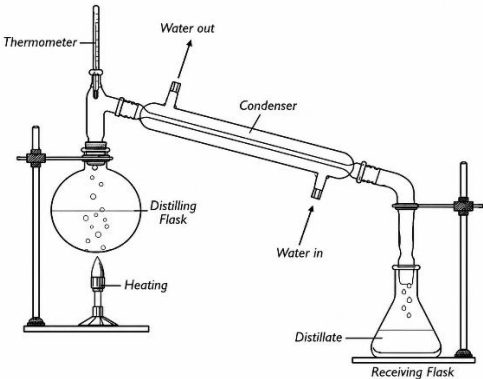
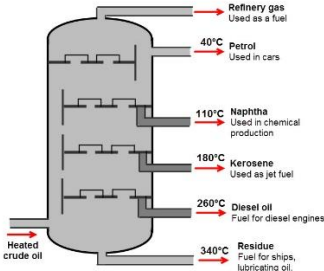
26. India has a long history of obtaining salt from seawater. Methods like boiling concentrated brines (Panga salt) or solar evaporation (Karkatch salt) are used.
 - (a) Why does the solvent "disappear" during evaporation?
 - (b) If we want to recover both salt and water, which method should we use?
 - (c) How does crystallization differ from simple evaporation in obtaining salt?

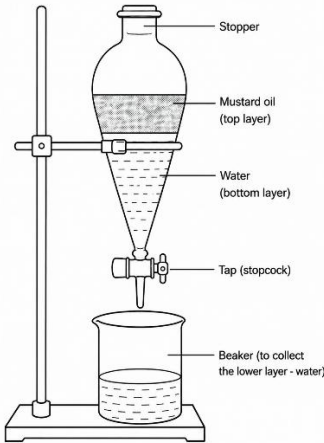
OR

(c) Name any one naturally occurring crystal.

ANSWERS

Q.No.	Answers
1	(c) Distillation
2	(d) Milk and water
3	(b) Homogeneous mixture
4.	(c) Sublimation
5	(b) It increases
6	(c) Less than 1 nm
7	(a) Filtration followed by evaporation
8	(c) Fractional Distillation
9	A. Both A and R are true, and R is the correct explanation of the Assertion.
10	C. A is true, but R is false.
11	A. Both A and R are true, and R is the correct explanation of the Assertion.
12	Principle: Denser particles are forced to the bottom and lighter particles stay at the top when spun rapidly. Used for blood/urine tests.
13	Alloy: Homogeneous mixture of two or more metals or a metal with a non-metal (e.g., brass). Cannot be separated physically because they behave as a single substance. (The components of an alloy cannot be separated by ordinary physical methods such as filtration or decantation because they are uniformly mixed at the particle level.)
14	Dispersed phase and Dispersion medium. Emulsion: Liquid dispersed in liquid.
15	Alum (coagulant) makes fine suspended particles clump and settle.
16	Step 1: Sublimation. Heat the mixture to remove ammonium chloride, which changes directly from solid to vapour. Step 2: Dissolution and Filtration. Add water to the remaining sand and salt. The salt dissolves while the sand remains as a residue on the filter paper. Step 3: Evaporation (or Crystallization). Heat the salt solution to obtain pure salt crystals
17	Crystallization is superior because simple evaporation can cause some solids (like sugar) to decompose or get charred when heated to dryness. Crystallization also helps remove soluble impurities that might remain in the solid after simple evaporation.
18	Clouds are colloids (specifically aerosols). They consist of a liquid (water droplets) or solid (ice crystals) dispersed in a gas (air). They exhibit the Tyndall Effect by scattering sunlight, which is why we see distinct "beams" of light through them.
19	The experiment will fail. If the solvent level is above the ink spot, the ink will dissolve directly into the solvent in the beaker instead of being carried up the paper to separate into different colour spots.

20	The two liquids A and B are miscible and have boiling points of 60°C and 90°C, respectively. Since their boiling points differ by 30°C, they can be separated by simple distillation. • Liquid A has the lower boiling point (60°C), so it vaporises first. • The vapour passes through the condenser, where it cools and changes back into liquid. • Liquid B, with the higher boiling point (90°C), remains in the distillation flask initially. 
21	If blood behaved like a true suspension, blood cells would settle at the bottom due to gravity when resting. This would block blood vessels, stop circulation, and prevent oxygen delivery to organs. In a blood sample, the dispersed phase is the blood cells, and the dispersion medium is the plasma
22	Fractional distillation separates a liquid mix into parts, called fractions, by heating them in a tall tower. Parts with lower boiling points turn to gas and rise to the top. Parts with higher boiling points stay as liquids or turn back to liquid lower down. It works for crude oil because crude oil has many different liquids with close boiling points. Simple distillation only separates liquids with very large boiling point gaps. 
23	Pour the mixed liquids into a separating funnel. Let the mixture rest until two clear layers form. Open the stopcock tap to drain the bottom water layer into a beaker. Close the tap when the oil reaches the stopcock, leaving the oil in the funnel.

	 Immiscible liquids form layers based on density. Stopcock allows draining the heavier bottom layer (water) first.
24	Filtration is effective for heterogeneous mixtures containing insoluble particles, such as muddy water. However, it is insufficient for homogeneous solutions containing dissolved substances. Crystallization succeeds because it allows the dissolved copper sulfate to separate from the water in the form of crystals.
25	(a)Centrifugation (b)Plasma (c)Colloid, because the particles remain dispersed and do not settle under normal condition (particle size is between 1-1000nm) OR (c)To separate cells from plasma for analysis.
26	(a) The water (solvent) changes into water vapour and escapes into the atmosphere. (b) Distillation (c) Crystallization produces pure solids in regular patterns OR (c)Quartz or Rock salt

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