

CHAPTER 5 – EXPLORING MIXTURES AND THEIR SEPARATION

Revision – 1 | Class IX Science | High Difficulty Level

Question Paper • Maximum Marks: 35 • Time: 1 Hour

1. Distinguish between a **solution**, **colloid**, and **suspension** on the basis of particle size, stability, visibility, and filtration.
2. Give scientific reasons:
(a) Salt solution cannot be separated by filtration.
(b) Colloids show the Tyndall effect.
(c) Crystallisation is preferred to evaporation to dryness for obtaining pure crystals.
3. A mixture contains **iron filings**, **sand**, **common salt**, and **ammonium chloride**. Design the correct sequence of separation. State the physical property used at each step.
4. A mixture contains **oil**, **water**, **dissolved salt**, and **suspended sand**. Arrange suitable separation techniques in the correct order and justify your sequence.
5. Two miscible liquids have boiling points of **78°C** and **100°C**. Which separation method is most suitable? Why is a separating funnel unsuitable?
6. River water contains **mud**, **dissolved salts**, **microorganisms**, and **insoluble impurities**. Explain why filtration alone is insufficient and suggest a suitable sequence to obtain purified water.
7. A mixture contains **copper sulphate**, **sand**, and **iron filings**. Plan a laboratory procedure to separate all three and obtain copper sulphate crystals. Mention the principle at each stage.
8. **Assertion:** A suspension can be separated by filtration.
Reason: Its particles are large enough to be retained by filter paper.
Choose: **A** Both true and R explains A; **B** Both true but R does not explain A; **C** A true, R false; **D** A false, R true.
9. **Assertion:** Fractional distillation is useful for separating miscible liquids with close boiling points.
Reason: It involves repeated vaporisation and condensation.
Choose: **A/B/C/D**.
10. A student says, "If two substances have different boiling points, simple distillation will always separate them effectively." Critically evaluate this statement.
11. Solids **P** and **Q** are dissolved in water. **P** is highly soluble in hot water but sparingly soluble in cold water; **Q** has nearly the same solubility in hot and cold water. How can **P** be separated from **Q**? Explain.
12. A mixture contains **salt** and **camphor**. Design a separation scheme using their physical properties. Explain why each technique works.

13. Fill in the suitable method:

- (a) cream from milk → _____ ;
- (b) oil and water → _____ ;
- (c) dyes in ink → _____ ;
- (d) pure water from salt solution → _____ ;
- (e) ammonium chloride from a suitable mixture → _____ .

14. **MASTER CHALLENGE** An unknown mixture contains an **insoluble solid**, a **soluble solid**, **two immiscible liquids**, and **iron filings**. Design a complete separation plan, naming the apparatus, physical property, and product obtained at every stage.