

CLASS 8

SCIENCE

EXTRA QUESTIONS

Extra Questions for Class 8 Science Chapter 8: Nature of Matter – Elements, Compounds and Mixtures

Original HOTS-level practice questions for Class 8 Science Chapter 8 (Nature of Matter: Elements, Compounds and Mixtures), going beyond the textbook exercise, with full explanations.

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Q1. A student says “brass is a compound because it’s a uniform, shiny solid.” Is this correct? Explain.

Solution: No — brass (copper + zinc) is an **alloy**, a homogeneous *mixture* of two metals melted together. Its composition can vary (typically 60–70% copper), and each metal retains its own atomic identity rather than forming new chemical bonds, unlike a true compound such as copper oxide.

Q2. Graphite (in pencils) is an element. Is graphene, a different physical form of carbon, also an element? Explain.

Solution: Yes. Graphite and graphene are both **allotropes of the single element carbon** — being an element depends only on atomic composition (only carbon atoms present), not on the physical/structural arrangement of those atoms.

Q3. Sea water is evaporated completely, leaving a white solid residue. Is sea water a compound or a mixture? How does this experiment prove it?

Solution: Sea water is a **mixture**. Evaporation is a purely physical method (no chemical reaction involved) that separates it back into water vapour and dissolved solid salts — a mixture, unlike a compound, can always be separated by physical means.

Q4. Sugar dissolved in water tastes sweet. Does this prove a new compound has formed?

Solution: No — this is a physical change, forming a homogeneous mixture (a solution). The sugar molecules disperse through the water but remain chemically unchanged, and can be fully recovered by evaporating the water, unlike a genuine chemical reaction which cannot be reversed by physical means.

Q5. An iron nail rusts when left in moist air. Identify every substance involved and its category (element, compound, or mixture).

Solution: Iron (element) reacts with moist air, which is a mixture of oxygen and water vapour, to form rust (hydrated iron oxide), a compound.

Q6. A colourless gas turns lime water milky. What is the gas, and what category of substance is lime water itself?

Solution: The gas is **carbon dioxide**. Lime water is a **mixture** — a dilute solution of calcium hydroxide in water. The milkiness is caused by a chemical reaction: $\text{Ca(OH)}_2 + \text{CO}_2 \rightarrow \text{CaCO}_3\downarrow + \text{H}_2\text{O}$, forming insoluble calcium carbonate.

Q7. Elements are made of only one kind of atom. Explain how oxygen can still exist as a molecule (O_2) while remaining an element.

Solution: An element’s defining feature is that all its atoms are the *same type* (same atomic number). O_2 is a diatomic molecule formed by two atoms of the *same* element bonding together — molecule formation doesn’t require different elements, so O_2 is still purely elemental oxygen.

Q8. You are given a mixture of salt and sand. Design a two-step physical separation method and explain why no chemical method is needed.

Solution: Step 1: add water and stir — salt dissolves, sand (insoluble) can be filtered out. Step 2: evaporate the filtrate to recover solid salt. No chemical method is needed because salt and sand are only physically intermixed (a heterogeneous mixture) with each substance keeping its own properties (solubility, density), which is exactly what’s exploited to separate them.