CLASS 8 · SCIENCE

Nature of Matter: Elements, Compounds, and Mixtures

Sample paper · 15 questions · 22 marks

10 objective questions × 1 mark. Five written-response questions: 12 marks. Write your working where needed. Suggested time: 45 minutes. Answers and marking guidance follow the questions.

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Section A · Objective questions (10 marks)

1. Which of these is an element?

A. Oxygen

B. Common salt

C. Water

D. Soil

2. A pure substance made of two or more elements chemically combined in a fixed ratio is called:

A. a mixture

B. a solvent

C. a compound

D. an alloy

3. Which of these is a uniform (homogeneous) mixture?

A. Muddy water

B. Sand mixed with iron filings

C. Oil floating on water

D. Salt dissolved fully in water

4. Iron filings mixed with sulfur powder (not heated) can be separated with a magnet because:

A. the magnet attracts sulfur too

B. the sulfur evaporates on standing

C. each component keeps its own properties in a mixture

D. the two have reacted chemically

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5. In a teacher-led laboratory demonstration, iron and sulfur react on heating to form a black solid. What is the main product?

A. iron oxide (rust)

B. iron sulfide

C. brass

D. pure sulfur

6. Which of these is a compound?

A. Seawater

B. Air

C. Bronze

D. Carbon dioxide

7. Brass, made by mixing copper and zinc uniformly, is best classified as:

A. a compound

B. a pure metal

C. an alloy, which is a uniform mixture

D. an element

8. The smallest particle of an element that can take part in a chemical reaction is:

A. an atom

B. a mixture

C. a solution

D. a molecule of a compound

9. In water, hydrogen and oxygen are always combined in the same fixed ratio. This shows that water is:

A. a compound

B. an alloy

C. a mixture

D. an element

10. A mixture of sand and salt can best be separated by:

A. using only a magnet

B. it cannot be separated at all

C. heating the mixture strongly

D. dissolving the salt in water, filtering, then evaporating the water

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Section B · Written responses (12 marks)

Attempt all five. Use a separate sheet if you need more space. The marks for each question are shown.

11. Classify seawater as an element, compound or mixture, and justify your answer. [2 marks]

12. Explain why air is called a mixture but water is called a compound. [2 marks]

13. Two cards describe powders. Card P: a magnet removes one component and leaves another behind. Card Q: every particle is a chemically joined unit containing two kinds of atom. Which card describes a mixture, and which a compound? Explain. [2 marks]

14. Classify each of the following as an element, a compound or a mixture: copper, ammonia, milk, helium, vinegar, ethanol. [3 marks]

15. A display labels a uniform copper-zinc alloy as an element because it looks like one substance. Identify the error. Explain why being uniform does not by itself prove that a material is an element, and give a different kind of uniform material. [3 marks]

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Answers & marking guidance

Use these after attempting the paper. Accept equivalent correct reasoning and sensible units. These are Evater model answers, not an official marking scheme.

Section A · 1 mark each

1. A — Oxygen is made of only one kind of atom; water and salt are compounds and soil is a mixture.

2. C — A compound forms when elements combine chemically in a fixed ratio, giving new properties.

3. D — A fully dissolved salt solution looks the same throughout, so it is a uniform mixture.

4. C — In a mixture the components are not chemically combined, so each keeps its own properties, including iron's magnetism.

5. B — Heating makes iron and sulfur react chemically to form the compound iron sulfide, a new substance with new properties.

6. D — Carbon dioxide is carbon and oxygen chemically combined in a fixed ratio; the others are mixtures.

7. C — Brass is an alloy: the metals are mixed, not chemically combined in a fixed ratio.

8. A — An atom is the smallest unit of an element that participates in chemical reactions.

9. A — A fixed ratio of chemically combined elements is the defining feature of a compound.

10. D — Salt dissolves but sand does not, so filtration removes the sand and evaporation recovers the salt.

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Section B · Model answers

11. Seawater is a (mostly uniform) mixture. It contains water, dissolved salts and gases that are not chemically combined, keep their own properties, and can be separated by physical methods such as evaporation.

Marking: 1 mark for mixture; 1 for the justification (components not chemically combined, separable by physical methods).

12. In air, the gases are physically mixed: their proportions can vary and each gas keeps its own properties. In water, hydrogen and oxygen are chemically combined in a fixed ratio, and water has completely different properties from both gases.

Marking: 1 mark for air's variable physical mixing; 1 for water's fixed chemical combination and new properties.

13. P is a mixture: physical separation shows that a component retains its properties. Q is a compound: different elements are chemically combined in each unit.

Marking: 1 mark for P with physical-separation reasoning; 1 mark for Q with chemical-combination reasoning.

14. Elements: copper, helium. Compounds: ammonia, ethanol. Mixtures: milk, vinegar.

Marking: 1 mark for both elements correct; 1 for both compounds correct; 1 for both mixtures correct.

15. An alloy can contain more than one element even though it looks uniform. Brass contains copper and zinc, so it is a mixture, not an element. Uniformity describes the distribution of components, not the number of kinds of atom. A fully dissolved salt solution is another uniform mixture; a pure compound such as water is also an acceptable uniform example.

Marking: 1 mark for rejecting the element label using copper and zinc; 1 mark for distinguishing uniform appearance from elemental composition; 1 mark for a valid further example.

Topic references

NCERT Class 8 Science, Curiosity, Chapter 8: Nature of Matter: Elements, Compounds, and Mixtures.

https://ncert.nic.in/textbook/pdf/hecu108.pdf

Concept reference only. Questions and model answers are original Evater practice material, not an official NCERT paper.

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