



EXERCISE 1.1

MODULE 1 TOPIC 1 Units 1 to 3,
p. 2 – 8 Gr 10 Physical Sciences 3-in-1

QUESTION 1

- 1.1 How can it be confirmed that a certain substance is an element?
- 1.2 How can a substance be identified as a compound?
- 1.3 Define a *mixture*.
- 1.4 Give THREE differences between a mixture and a compound.
- 1.5 Consider the following substances or materials and classify them either as an *element*, a *compound* or a *mixture*.
 - 1.5.1 aluminium foil
 - 1.5.2 sugar
 - 1.5.3 plastic spoon
 - 1.5.4 paper bag
- 1.6 Formulate TWO questions that will help you decide whether a mixture is homogenous or heterogenous.
- 1.7 Apply the answers to the **questions in 1.6** to classify the following mixtures as homogenous or heterogenous:
 - 1.7.1 mixed herbs and spices
 - 1.7.2 dilute, clear apple juice

QUESTION 2

- 2.1 What:
 - 2.1.1 is a solution?
 - 2.1.2 are the two general components in a solution called?
- 2.2 Classify the following list of substances as an *element*, *compound*, *homogeneous* or *heterogeneous mixture*:
 - 2.2.1 stainless steel plate
 - 2.2.2 marble slab (CaCO_3)
 - 2.2.3 graphite in a pencil
 - 2.2.4 muesli
 - 2.2.5 an orange
 - 2.2.6 vinegar (CH_3COOH)
 - 2.2.7 steam
 - 2.2.8 argon gas

QUESTION 3

- 3.1 Which of the following is/are homogeneous mixtures?
 - 3.1.1 ethanol and water
 - 3.1.2 iodine and ethanol
 - 3.1.3 iodine and water
- 3.2 A mixture of sulphur powder and iron filings has to be separated again into its two components, i.e. sulphur and iron.

You do not have a magnet available, only liquid carbon bisulphide (CS_2) which can act as a solvent for sulphur. Briefly explain the steps involved in separating the sulphur powder and iron filings.

EXERCISE ANSWERS

QUESTION 1

- 1.1 If the symbol of a substance can be found in the Periodic Table, it is an element.
- 1.2 If a substance is a combination of two or more elements (types of atoms) that are chemically bonded in a fixed ratio, it is a compound.
- 1.3 A mixture is a combination of two or more substances in which each substance retains its own properties.
- 1.4

Mixture	Compound
Substances in mixture can be mixed in any proportion	Consist of two or more elements combined in a fixed ratio
Substances in mixture retain their own unique physical properties	The properties of a compound differ from those of the constituent elements
A mixture can be separated again by physical methods	A compound cannot be separated by physical methods into its constituent elements

- 1.5.1 element 1.5.2 compound
- 1.5.3 compound 1.5.4 mixture
- 1.6
- Can the particles in the mixture be distinguished from one another?
 - Are the particles evenly distributed / does the mixture look the same throughout?
 - Can one phase or more than one phase of matter be distinguished?

(any two)

- 1.7.1 heterogeneous 1.7.2 homogeneous

QUESTION 2

- 2.1.1 A solution is an example of a homogeneous mixture when one substance is dissolved in another substance.
- 2.1.2 Solvent and solute
- 2.2.1 homogeneous mixture 2.2.2 compound
- 2.2.3 element 2.2.4 heterogeneous mixture
- 2.2.5 heterogeneous mixture 2.2.6 compound
- 2.2.7 compound 2.2.8 element

QUESTION 3

- 3.1.1 homogeneous 3.1.2 homogeneous
- 3.1.3 heterogeneous
- 3.2 Add carbon disulphide (CS_2) to the mixture:
- The sulphur dissolves in the carbon disulphide, forming a solution.
 - The iron filings remain as an insoluble solid.
 - Filter the mixture: the iron filings stay on the filter paper, while the sulphur solution passes through.
 - Finally, evaporate the carbon disulphide to recover the sulphur.