

Worksheet 4.1 Elements, Mixtures and Compounds

Name: _____ Class: _____ Date: _____

Elements:

- An element is a **pure substance** which cannot be broken down into any simpler substances by any ordinary physical or chemical methods.
- All metals** (e.g. Sodium, Magnesium, Aluminium) exist as **solid** at room temperature except for mercury.
- Non- metals** such as **Hydrogen, Oxygen, Nitrogen, Fluorine, Chlorine, Helium, Argon,** and **Neon** exist as **gases** at room temperature.
- Only **Bromine (non-metal)** and **Mercury (metal)** exist as **liquid** at room temperature.
- Properties of Metals and Non-metals:

Metals	Non-metals
Good conductors of heat	Poor conductors of heat
Good conductors of electricity	Poor conductors of electricity
Usually hard	Usually soft
Shiny in appearance	Dull in appearance
Malleable & ductile	Brittle

- Periodic Table:
 - Row in Periodic Table is known as **Period**
 - Column in Periodic Table is known as **Group**
 - Elements in **same group** have **similar chemical properties**
 - Across a period from left to right, there's a gradual **change from metallic properties to non-metallic properties**.
- Uses of Some Common Elements

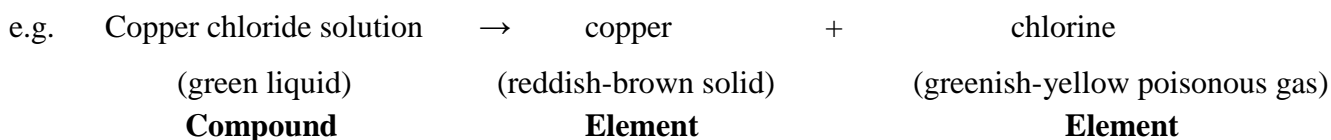
Element	Uses
Gold	to make sculptures, ornaments and jewellery
Hydrogen	for fuel in space shuttles
Copper	to make water pipes, copper wire
Iron	to make bridges, ships and buildings
Aluminium	Make aircraft
Silicon	to make electronic parts for radios, televisions and computers
Mercury	used in thermometers
Helium	to fill balloons, weather balloons and airships
Chlorine	to kill bacteria in swimming pools and drinking water

Compounds:

1. A compound is a substance made up of **2 or more elements** chemically combined together
2. Examples of compounds:

Compound	Their elements which made up the compound
Water (H ₂ O)	Hydrogen, oxygen
Nitrogen oxide	Nitrogen , Oxygen
Common salt/ Table salt (sodium chloride)	Sodium , Chlorine
Sugar	Carbon, Hydrogen , Oxygen
Chalk (Calcium carbonate)	Calcium, Carbon , Oxygen
Sand (Silicon dioxide)	Silicon and Oxygen

3. A compound can be broken down into simpler substances by **heat or electricity**.



Mixtures:




1. A mixture is made up of 2 or more substances **not** chemically combined together.

E.g. **Sea water; Bronze; Milk; Air; Blood; Salt solution**

2. Differences between mixture & compound:

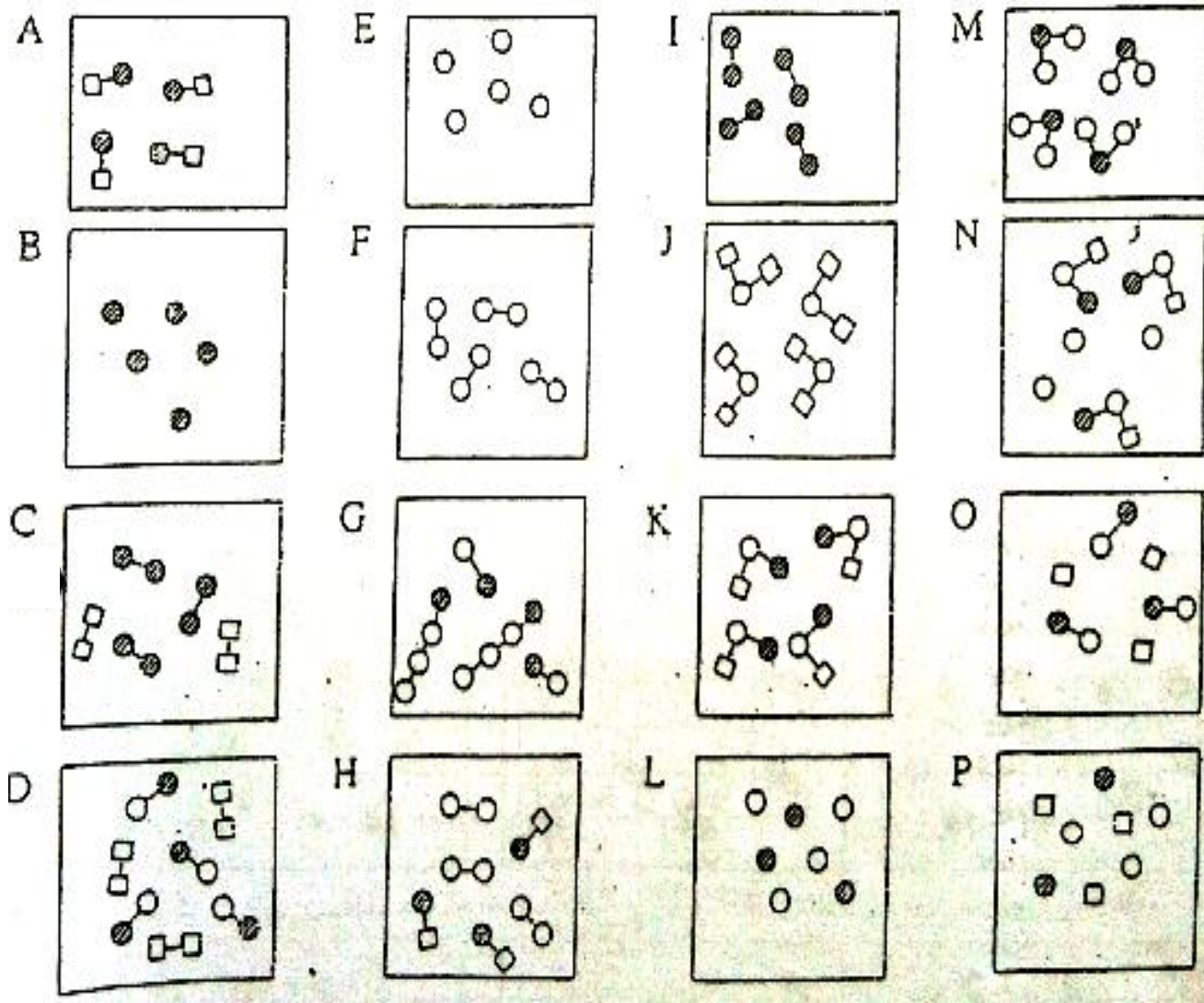
Mixture	Compound
made up of 2 or more substances <u>not</u> chemically combined together	made up of <u>2 or more elements</u> chemically combined together.
can be separated by any physical methods like filtration, evaporation, etc.	cannot be separated by any physical methods like filtration, evaporation, etc.
<u>No</u> chemical change or reaction must occur in order to form a mixture	To form a compound, a chemical change or reaction <u>must</u> occur
A mixture has <u>no fixed boiling or melting point</u> .	Pure compound has <u>a fixed boiling or melting point</u>
A mixture has the properties of the substances that make it up.	A compound <u>doesn't</u> have the properties of the substances that make it up.

Exercises

1. The following diagrams show the composition of 16 different materials (A to P) in terms of the arrangement of their atoms. There are three kinds of atoms represented by ,  and .

Identify the diagram(s) that matches each of the following descriptions.

- (a) A mixture of an element and a compound. _____
- (b) A compound made up of two elements. _____
- (c) An element made up of single atoms. _____
- (d) A mixture of two elements. _____
- (e) An element made up of molecules. _____
- (f) A mixture of two compounds. _____
- (g) A compound made up of three elements. _____



2. Classify each of the pictures below by placing the correct label in the blanks below.

A = Element

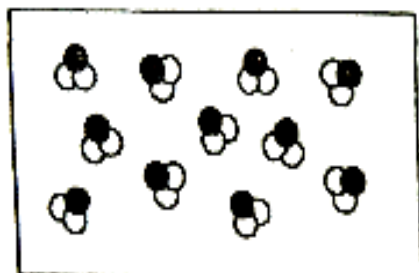
B = Compound

C = Mixture of Element

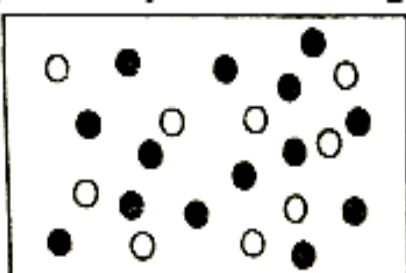
D = Mixture of compounds

E = Mixture of Elements and compounds

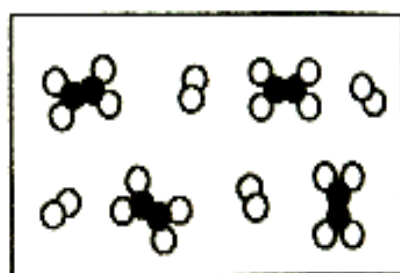
Each circle represents an atom and each different color represents a different kind of atom. If two atoms are touching, then they are bonded together.



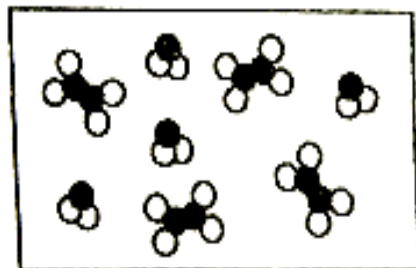
1) _____



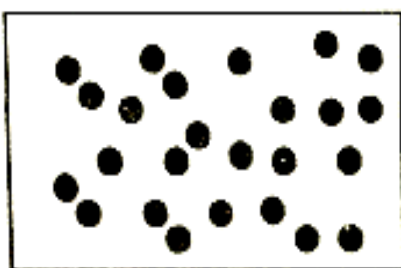
2) _____



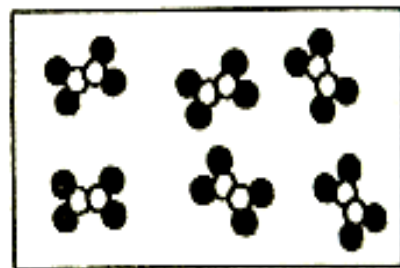
3) _____



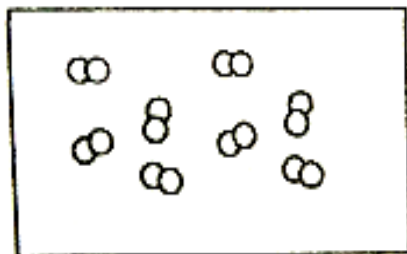
4) _____



5) _____



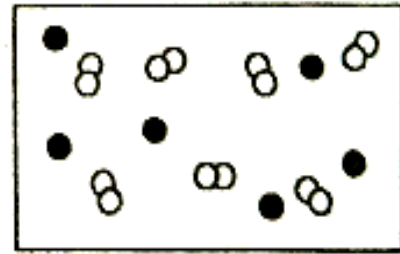
6) _____



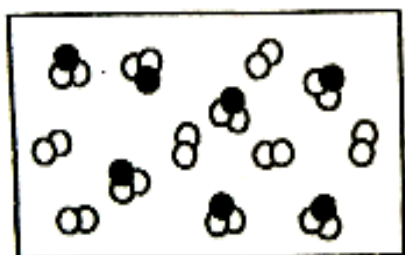
7) _____



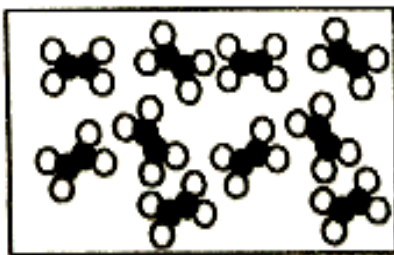
8) _____



9) _____



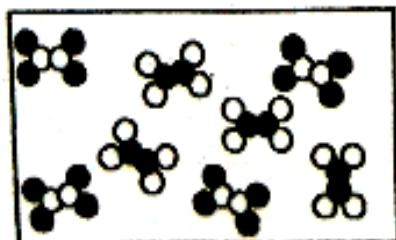
10) _____



11) _____



12) _____



13) _____



14) _____



15) _____

8. *Anhydrite* is a white rock with the formula CaSO_4 .
Name the elements present in *anhydrite* and state whether each one is a metal or a non-metal.

9. A list of substances is given below.

<i>Air</i>	<i>Water</i>	<i>Ethanol</i>	<i>Steel</i>
<i>Graphite</i>	<i>Petrol</i>	<i>Chromium</i>	

Choose from the list **one** substance which

- (i) is an element. _____
- (ii) is a compound containing two elements only. _____
- (iii) is a mixture of compounds. _____
- (iv) is a mixture of elements. _____
10. The table below shows the properties of 4 elements, K, L, M and N.

Element	Electrical conductivity	Thermal conductivity	Melting point	Strength
K	High	Low	Low	Brittle
L	High	High	High	Strong
M	Low	Low	Low	Brittle
N	High	High	Low	Strong

Which element is definitely a metal? Give your reason.
