8.2 WORKED EXAMPLES

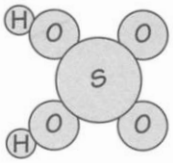
1. Complete the table below.

Atom	Name of element	Number of protons	Number of electrons	Number of neutrons
$^{1}_{1}H$				
$^{16}_{8}O$				
$^{27}_{13}Al$				

Answer Analysis

Atom	Name of element	Number of protons	Number of electrons	Number of neutrons
$^{1}_{1}H$	Hydrogen	1	1	0
$^{16}_{8}O$	Oxygen	8	8	8
$^{27}_{13}Al$	Aluminium	13	13	14

2. Sulfuric acid is a common laboratory acid. A molecule of this compound can be represented as shown in the diagram. Which of these statements about the sulfuric acid molecule are correct?



I The molecule contains three elements.
II The molecule contains four oxygen molecules.
III There are seven atoms in this molecule.
IV The elements present in this molecule are hydrogen, oxygen and sodium.

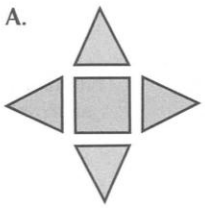
A. I and II
B. I and III
C. I, II and III
D. All of them

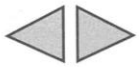
Answer Analysis

The correct answer is B.

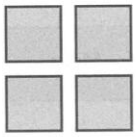
Sulfuric acid, H_2SO_4, contains the three elements hydrogen, sulfur and oxygen (eliminates IV). It contains two hydrogen atoms, one sulfur atom and four oxygen atoms (not molecules, which eliminates II). In total, there are seven atoms in this molecule.

3. ▼, ● and ■ represent atoms of three different elements. Molecules containing these atoms are shown below.

A. 

B. 

C. 

D. 

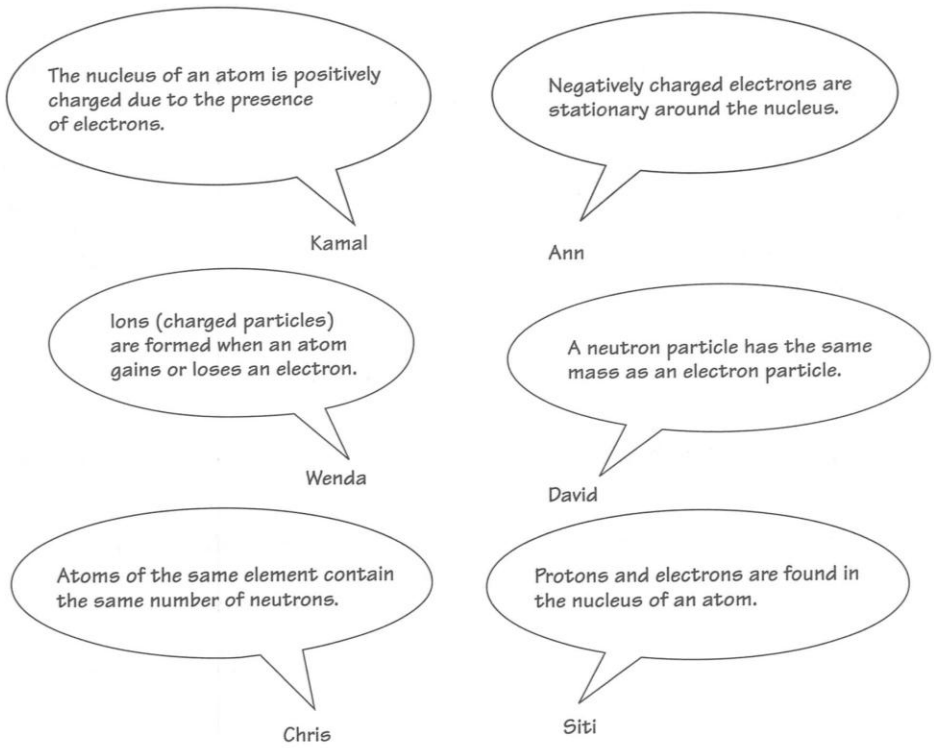
Explain which of these molecules are elements and which are compounds.

Answer Analysis

A and C are compounds as they consist of a fixed number of different kinds of atoms chemically combined together.

B and D are elements as they consist of a fixed number of one kind of atom chemically combined together. Elements such as B which contain two atoms are said to be diatomic. Diatomic elements include oxygen O_2, hydrogen H_2, Cl_2. Elements such as D which contain four atoms are said to be tetratomic. An example of a tetratomic element is phosphorus P_4.

4. Some students were having a group discussion about atoms and atomic structure.



Only one of these six statements is entirely true. Which one is it?

Correct the other five statements and write them in the table below.

Student	Corrected statement

Answer Analysis

Wenda's statement is entirely true.

Student	Corrected statement
Kamal	The nucleus in an atom is positively charged due to the presence of protons.
Ann	Negatively charged electrons are moving around the nucleus.
David	A neutron particle has the same mass as a proton particle.
Chris	Atoms of the same element contain the same number of protons (or electrons).
Siti	Protons and neutrons are found in the nucleus of an atom.

8.3 GLOSSARY OF TERMS

Atom	The smallest particle of an element that can take part in a chemical reaction.
Atomic number	The number of protons (or electrons) in an atom of an element. It is also called the proton number.
Chemical symbol	One or two letters (the first letter must be a capital letter) used to represent an atom of a particular element.
Compound	A substance formed when two or more different elements chemically combine together.

Electron	A negatively charged sub-atomic particle which is found in all atoms. Electrons orbit around the nucleus.
Element	Substance which cannot be broken down into anything simpler by any chemical means.
Mass number	The total number of protons and neutrons in the nucleus of an atom.
Molecule	Consists of two or more atoms chemically combined together.
Neutron	Neutral sub-atomic particle found in the nucleus of atoms.
Nucleus	Small, heavy, central part of all atoms comprising of protons and neutrons.
Nuclear energy	Energy released when the nucleus of an atom is split up. Nuclear energy is often called atomic energy.
Proton	The positively charged sub-atomic particle found in the nucleus of all atoms.
Proton number	The total number of protons found in the nucleus of an atom of a particular element. This identifies the element. It is also called the atomic number.
Sub-atomic particle	Particles like the proton, neutron and electron which are found in atoms.