Diagóstico:

1. Identifique el tema. Justifique.

2. Identifique oraciones.

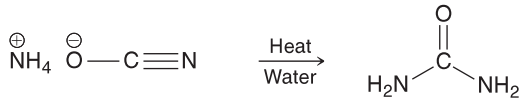
3. Identifique palabras parecidas al castellano. Clasifique.

5. Identifique verbos.

6. Identifique adjetivos.

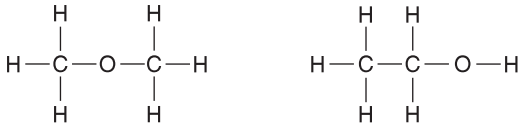
1.2 The Structural Theory of Matter

In the mid-nineteenth century three individuals, working independently, laid the conceptual foundations for the structural theory of matter. August Kekulé, Archibald Scott Couper, and Alexander M. Butlerov each suggested that substances are defined by a specific arrangement of atoms. As an example, consider the structures of ammonium cyanate and urea from Wöhler's experiment:



Ammonium cyanate **Urea**

These compounds have the same molecular formula (CH_4N_2O), yet they differ from each other in the way the atoms are connected—that is, they differ in their **constitution**. As a result, they are called **constitutional isomers**. Constitutional isomers have different physical properties and different names. Consider the following two compounds:



Dimethyl ether
Boiling point = −23°C

Ethanol
Boiling point = 78.4°C

These compounds have the same molecular formula (C_2H_6O) but different constitution, so they are constitutional isomers. The first compound is a colorless gas used as an aerosol spray propellant, while the second compound is a clear liquid, commonly referred to as "alcohol," found in alcoholic beverages.

According to the structural theory of matter, each element will generally form a predictable number of bonds. The term **valence** describes the number of bonds usually formed by each element. For example, carbon generally forms four bonds and is therefore said to be **tetravalent**. Nitrogen generally forms three bonds and is therefore **trivalent**. Oxygen forms two bonds and is **divalent**, while hydrogen and the halogens form one bond and are **monovalent** (Figure 1.1).

Tetravalent	*Trivalent*	*Divalent*	*Monovalent*
—C—	—N—	—O—	H— X— (where X = F, Cl, Br, or I)
Carbon generally forms ***four*** bonds.	Nitrogen generally forms ***three*** bonds.	Oxygen generally forms ***two*** bonds.	Hydrogen and halogens generally form ***one*** bond.

FIGURE 1.1
Valencies of some common elements encountered in organic chemistry.