

**Suggested Answers**

- (a) nitrogen tri-iodide, carbon tetrachloride, oxygen difluoride, diphosphorus pentoxide, dinitrogen trioxide

(b) Each prefix in the chemical name indicates the number of atoms of that element in the compound. No prefix for the first element implies "one."
- (a) CO                      (d)  $\text{NBr}_3$

(b)  $\text{SF}_4$                 (e)  $\text{CS}_2$

(c)  $\text{N}_2\text{O}_4$
- (a) non-metals: sulfur, oxygen; molecular; sulfur dioxide

(b) metal: lead, non-metal: oxygen; ionic; lead(IV) oxide

(c) metal: aluminum, non-metal: chlorine; ionic; aluminum chloride

(d) non-metals: nitrogen, oxygen; molecular; dinitrogen oxide

(e) metal: potassium, non-metals: chlorine, oxygen; ionic; potassium chlorate

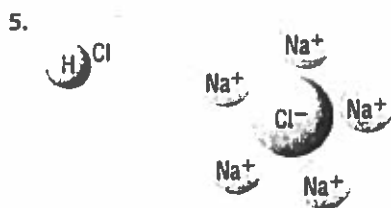
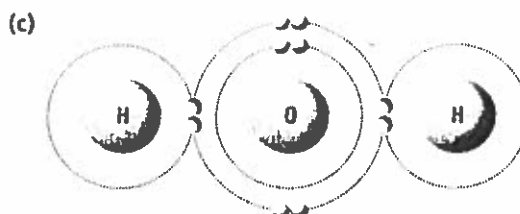
(f) metal: tin, non-metal: oxygen; ionic; tin(IV) oxide

(g) metal: iron, non-metals: phosphorus, oxygen; ionic; iron(III) phosphate

(h) non-metals: nitrogen, oxygen; molecular; dinitrogen tetroxide

- (a) hydrogen: 1, oxygen: 6

(b) hydrogen: 1, oxygen: 2



Hydrogen chloride is a discrete molecule because it shares electrons and neither particle is charged. Sodium chloride has a crystal structure of many sodium and chloride ions, all charged, all keeping one another in place.

6. Ionic compounds achieve stability by taking electrons from one another to achieve full outer orbits. The individual charged ions form a stable crystal in which electrostatic forces hold each ion in its place. Molecular compounds achieve stability by sharing electrons to fill outer orbits.
- (a) Fossil fuels are non-renewable because they are not easily replaced once they are used. New fossil fuels may be forming underground, but not quickly enough to keep up with current use.

(b) Two main benefits that we get from fossil fuels are energy and petrochemicals.

(c) Disadvantages of our fossil fuel dependence are that fossil fuels release pollution and that their supply is limited.
8. A single atom of chlorine does not have a stable arrangements of electrons; it is one electron short of having a complete outer orbit. Sharing electrons allows a pair of chlorine atoms both to fill their outer orbits and achieve noble gas-like stability.
9. The actual hydrogen peroxide molecules each have two hydrogen atoms and two oxygen atoms. The chemical formulas of molecular compounds always include all the atoms in the molecule.
- (a) A metal in the chemical formula reveals that it is an ionic compound.

(b) Ionic compounds tend to be hard, brittle, solids, some of which readily dissolve in water to conduct electricity. Molecular compounds can be solid, liquid, or gas, and often do not dissolve. When dissolved, they generally do not conduct electricity.
11. Oil is used not only to transport goods, but also to make such products as fertilizers and plastics. A rise in oil prices would affect the production cost of many goods, so would likely increase the purchase prices also.