1. Base your answer to the following question on Given a formula for oxygen:

   \[
   \text{O} = \text{O}
   \]

   What is the total number of electrons shared between the atoms represented in this formula?
   
   1) 1  
   2) 2  
   3) 8  
   4) 4

2. What is the total number of electron pairs shared between the two atoms in an \( \text{O}_2 \) molecule?
   
   1) 1  
   2) 2  
   3) 6  
   4) 4

3. Which molecule will have a double covalent bond?
   
   1) \( \text{F}_2 \)  
   2) \( \text{O}_2 \)  
   3) \( \text{Cl}_2 \)  
   4) \( \text{N}_2 \)

4. Which type of bonding is found in all molecular substances?
   
   1) covalent bonding  
   2) hydrogen bonding  
   3) ionic bonding  
   4) metallic bonding

5. Which is the correct electron-dot formula for a hydrogen molecule at STP?
   
   1) \( \text{H}^- \)  
   2) \( \text{H}^+ \)  
   3) \( \text{H} : \text{H} \)  
   4) \( \text{H} : \text{H} \)

6. What is the total number of pairs of electrons shared in a molecule of \( \text{N}_2 \)?
   
   1) one pair  
   2) two pairs  
   3) three pairs  
   4) four pairs

7. Multiple covalent bonds exist in a molecule of
   
   1) \( \text{F}_2 \)  
   2) \( \text{N}_2 \)  
   3) \( \text{Br}_2 \)  
   4) \( \text{H}_2 \)

8. Base your answer to the following question on the information below.

   At STP, iodine, \( \text{I}_2 \), is a crystal, and fluorine, \( \text{F}_2 \), is a gas. Iodine is soluble in ethanol, forming a tincture of iodine. A typical tincture of iodine is 2% iodine by mass.

   Draw a Lewis electron-dot diagram for a molecule of \( \text{I}_2 \).

9. Base your answer to the following question on the balanced equation below.

   \[ 2\text{Na}(s) + \text{Cl}_2 \rightarrow 2\text{NaCl}(s) \]

   Draw a Lewis electron-dot diagram for a molecule of chlorine, \( \text{Cl}_2 \).

10. Bromine is the only liquid nonmetallic element at room temperature. It is a heavy, mobile, reddish-brown liquid, volatilizing readily at room temperature to a red vapor with a strong disagreeable odor, resembling chlorine, and having a very irritating effect on the eyes and throat; it is readily soluble in water or carbon disulfide, forming a red solution, is less active than chlorine but more so than iodine; it unites readily with many elements and has a bleaching action; when spilled on the skin it produces painful sores. It presents a serious health hazard, and maximum safety precautions should be taken when handling it.

   a Draw the electron-dot diagram of a molecule of bromine, \( \text{Br}_2 \).
   
   b Why does bromine have properties resembling chlorine?
Answer Key
Covalent Bonding Between Atoms of Different Nonmetal Elements

1. \(4\)
2. \(2\)
3. \(2\)
4. \(1\)
5. \(4\)
6. \(3\)
7. \(2\)
8. \\
9. \\
10. \\

Chemistry!