Name _____
Date _____
Due Date _____

Mark _____/54
Correct and Hand in Again by _____

Chemistry 11

Hand In Assignment # 14 – Chemical Bonding

This Assignment will be marked and you are allowed to do one set of corrections. Show all of your work, including units in your work and answers.

1. In Electron-Dot (Lewis) structures, only the valence electrons are represented. (1 mark)

2. Draw Electron-Dot structures for the following atoms: (8 marks)

Li	Be	B	C	N	O	F	Ne
Li·	·Be·	·B·	·Ċ·	·N·	:O·	:F·	:Ne:

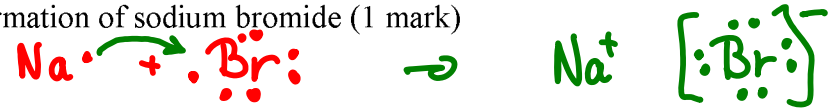
3. Define **electronegativity** (1 mark) – attraction an atom has for a shared pair of e⁻'s or for another atom's e⁻s

4. As you move from left to right in a period (horizontal row), the electronegativity of elements tends to increase. (1 mark)

5. As you move down a vertical column, electronegativity of elements tends to decrease. (1 mark)

6. When the electronegativities of two elements are very different, what type of bond will form? (1 mark) ionic

7. Use electron-dot diagrams to show the formation of sodium bromide and magnesium sulphide. (Use the examples on page 172 of SW to help you.)
   a) formation of sodium bromide (1 mark)



   b) formation of magnesium sulphide (1 mark)

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8. a) What can be said about the **melting points** of ionic compounds in general? (1 mark)

   high

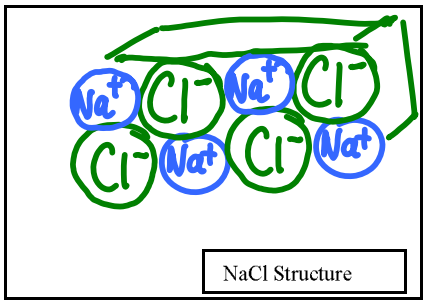
   b) What is the reason for this? (1 mark)

   - ionic bonds are quite strong

9. Which of the following best describes the structure of the ionic compound NaCl? (1 mark)
   a) neutral molecules consisting of Na and Cl atoms bonded together.
   b) separate Na and Cl atoms which attract each other by London forces.
   c) a "crystal lattice" which consists of Na^+ and Cl^- ions all stacked together held by the attraction between + and – charges.

   Answer C

   Draw a little sketch of what this structure looks like: (1 mark)



NaCl Structure

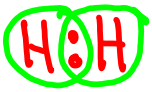
10. What happens to valence electrons in **covalent** bonding? (1 mark)

    shared

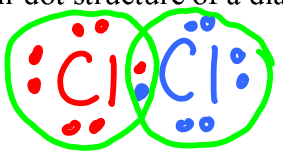
11. State the **octet rule**: (1 mark)

    - atoms in Groups 1-2 & 13-17 lose or gain e⁻'s to achieve a stable octet (8 e⁻) (Except H which ends up with 2 e⁻)

12. a) Show the electron-dot structure of a diatomic molecule of H_2. (1 mark)



    b) Show the electron-dot structure of a diatomic molecule of Cl_2. (1 mark)

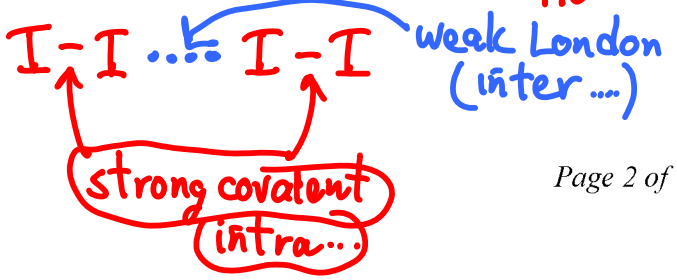


non-polar covalent bond

    c) In diatomic molecules of elements, the electronegativities of the two atoms are equal, so the electrons are shared equally. (2 marks)

13. Name three substances which consist of huge molecules in which **all** the atoms are covalently bonded to each other in a network. (3 marks) diamond (C), SiC & BN.
    The melting points of these substances are all very high. (1 mark)

14. In a crystal of solid I_2, the bonds between "I" atoms in each molecule are (*strong/weak*) strong while the forces of attraction between one I_2 molecule and another are (*strong/weak*) weak.
    When iodine is melted, are the covalent bonds between the "I" atoms broken? no.
    (3 marks)



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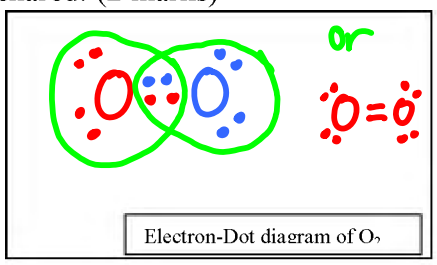
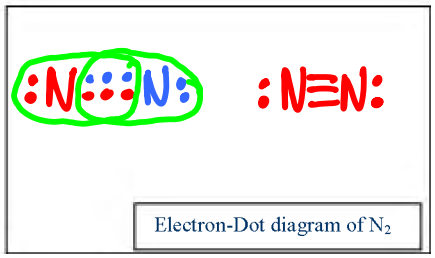
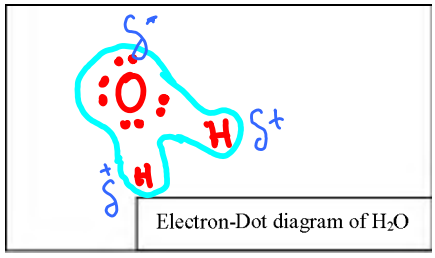
15. Draw electron-dot structures for an O_2 and an N_2 molecule to show how valence electrons are shared. (2 marks)





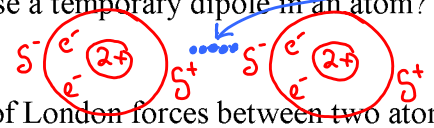
16. In **polar covalent** bonding like in a water molecule, valence electrons are (*equally/unequally*) unequally shared between the "O" and "H" atoms. (1 mark) Draw the electron-dot structure of water, showing how the valence electrons are shared. Also show the partial charges near the "O" atom and near the "H" atoms (Use ∂+ and ∂-) (1 mark)



17. Define a **dipole** (1 mark)- has a partial (+) on one end and a partial (−) on the other end.

18. What can cause a temporary dipole in an atom? (1 mark) (see p. 180 SW.) London Force

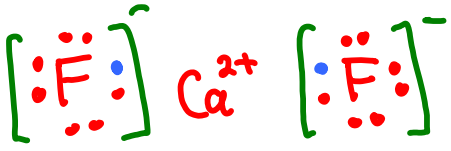
e⁻'s on same side



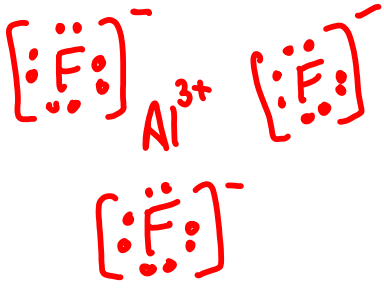
19. The strength of London forces between two atoms depends on the number of e⁻'s (1 mark)
20. The weakest type of bonding force known are called London (1 mark)
21. Covalent bonds are (*intramolecular/intermolecular*) intramolecular .(1 mark)
22. London forces are (*intramolecular/intermolecular*) intermolecular .(1 mark)
23. Draw Lewis Structures (Electron-dot diagrams) for the following ionic compounds: (2 marks)

no sharing

a) CaF_2



b) AlF_3



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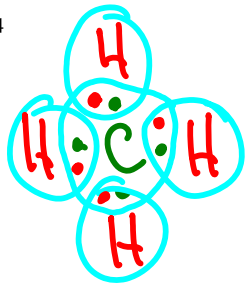
24. Draw Lewis Structures (Electron-dot diagrams) for the following covalent compounds: (10 marks)

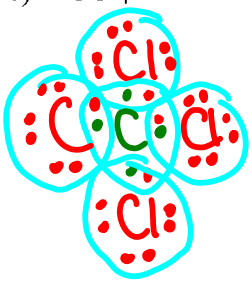
sharing

a) NH_3

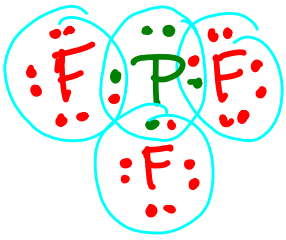
b) CH_4



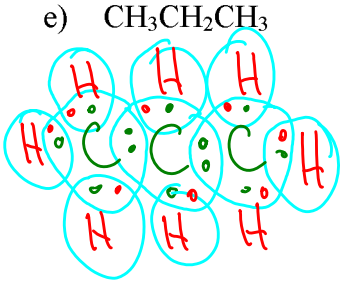
c) CCl_4



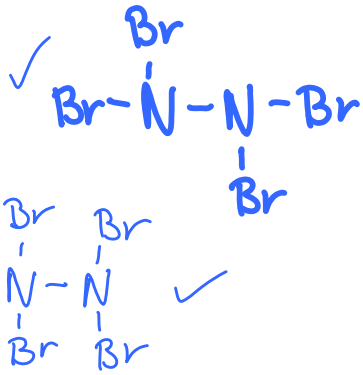
d) PF_3



e) $CH_3CH_2CH_3$

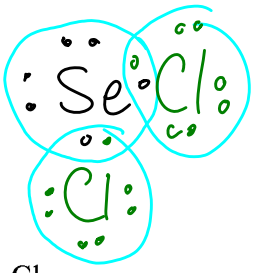


f) N_2Br_4

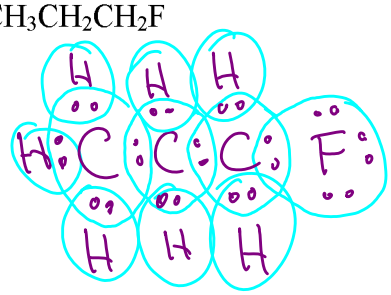


g) H_2S

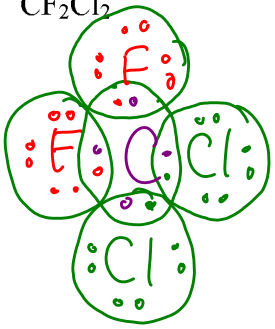
h) $SeCl_2$

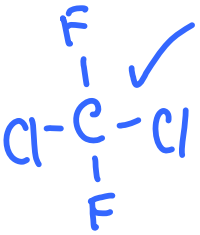


i) $CH_3CH_2CH_2F$



j) CF_2Cl_2





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