Name ____________________________ Test 2
PHYS 0107 (Intro Chem) Fall 2006

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18. _______

1. When metals like sodium (symbol = Na) and magnesium (Mg) react, they tend to
a. (4 pts.) gain or lose electrons?

b. (4 pts.) form ionic or molecular compounds with elements like chlorine (Cl)?

2. When non-metals like sulfur (S) and iodine (I) react, they tend to
a. (4 pts.) gain or lose electrons?

b. (4 pts.) form ionic or molecular compounds with elements like chlorine (Cl)?

3. (2 pts. each) If the following atoms were to become an ions, their charges would likely be what?

a. K b. F c. O

d. N e. Al f. Ca

4. (2 pts. each) If the following atoms filled their valence shells by forming covalent bonds with other atoms, they would like form how many covalent bonds?

a. C b. Cl c. S

d. H e. Si f. P

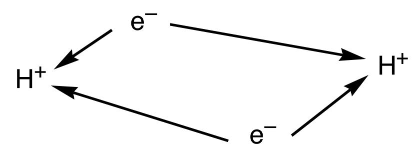
5. (4 pts. each) Predict the formulae for ionic compounds made from the following elements.

a. Li and F b. Al and O

c. Na and P d. Be and S

6. (8 pts.) When ionic compounds form what is it that keeps the ions together?

7. (8 pts.) When two hydrogen atoms come together, they form a covalent bond. The bond can be modeled using the diagram below.



Explain why the two hydrogen atoms stay together as an H_2 molecule.

8. Draw Lewis structures for the following atoms or ions.

a. O	b. Br^-	c. I
d. K	e. N	f. S^-

H 2.1	Electronegativities of Selected Elements						He
Li 1.0	Be 1.5	B 2	C 2.5	N 3.0	O 3.5	F 4.0	Ne
Na 0.9	Mg 1.2	Al 1.5	Si 1.8	P 2.1	S 2.5	Cl 3.0	Ar
						Br 2.8	Kr

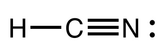
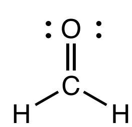
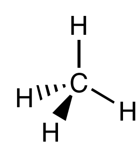
9. a. Classify the following covalent bonds as polar or nonpolar.
b. For the polar bonds indicate which end is positive and which is negative (use δ^+ and δ^-).

i. H—O	ii. N—Cl	iii. B—F
iv. N—H	v. Be—F	vi. P—Cl

10. (6 pts. each) Draw Lewis structures for the following molecules.

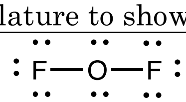
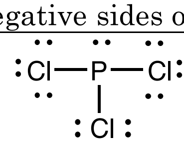
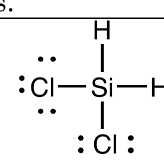
a. SCS (C is the central element)	b. $CHCl_3$ (C is the central element)	c. N_2

Three common molecular geometries

linear	trigonal planar	tetrahedral
		

11. a. (3 pts. each) Use the following Lewis structures and VSEPR Theory, to predict the shapes of the following molecules. (Draw the shapes)

b. (3 pts. each) Determine which of the following molecules is polar, and use the δ^+ and δ^- nomenclature to show the positive and negative sides of the polar molecules.

a. 	b. 	c. 

12. (6 pts.) Rank the following forces of attraction in order of increasing strength.

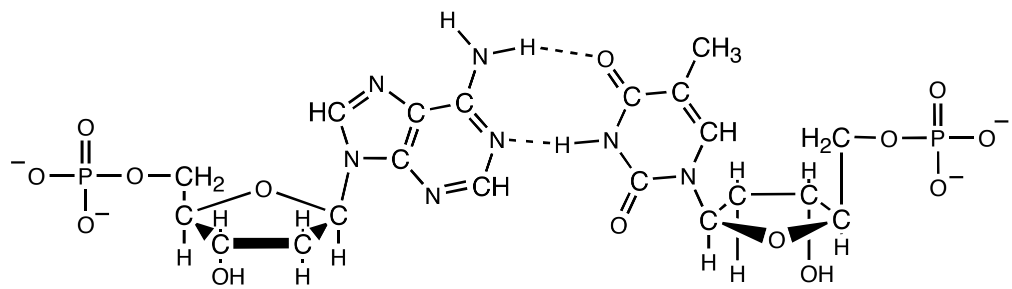
dipole-dipole interactions, covalent bonds, hydrogen bonds, ionic bonds, London dispersion forces

13. a. (4 pts.) Which force is responsible for the base pairing between DNA molecules, which is pictured below?

b. (4 pts.) Circle the area where the interaction is occurring.

adenine

thymine

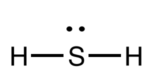
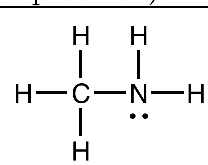
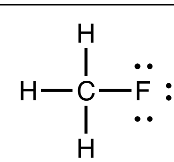
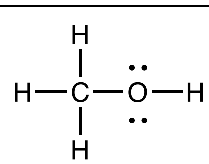
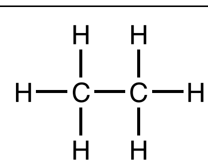
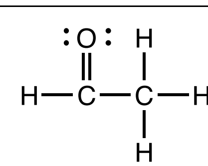


deoxyadenosine monophosphate

deoxythymidine monophophate

14. (8 pts.) Briefly explain how the yellow and blue dyes in a green mark are separated when performing paper chromatography.

15. (2 pts. each) For which of the following would hydrogen bonding be an important intermolecular force (Lewis structures are provided).

a. 	b. 	c. 
d. 	e. 	f. 

16. (6 pts. each) Balance the following chemical equations

a. $BH_3 + C_3H_6 \longrightarrow C_9H_{21}B$

b. $Pb(NO_3)_2\ (aq) + Na_2SO_4\ (aq) \longrightarrow PbSO_4(s) + NaNO_3\ (aq)$

17. (4 pts. each) Determine the mass of one mole of the following chemicals.

a. $Hg(NO_3)_2$	b. H_2O	c. CH_3CH_2OH

18. (10 pts.) If 0.945 g of AgCl is formed during the following reaction, how much LiCl must have been present initially?

$AgNO_3\ (aq) + LiCl\ (aq) \longrightarrow AgCl(s) + LiNO_3\ (aq)$