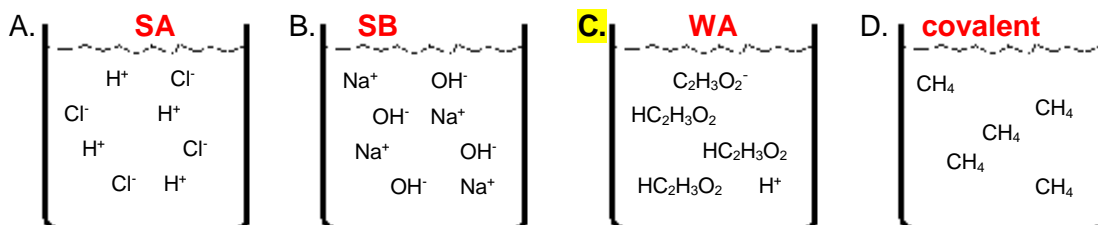


Lisa Diebolt

Part One: Multiple Choice. Choose the best answer for each question and write the corresponding letter in the provided blank. (22 pts)

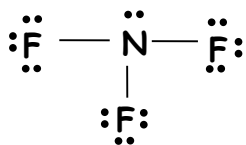
- ___ 1. Which of these atoms is the smallest? **Size ↓ as we go ↑ and size ↓ as we go →**
 A. Al B. Li C. I **D. O** closest to top right on P. Table E. S
- ___ 2. Which atom has the lowest ionization energy? **IE ↓ as we go ↓ and IE ↓ as we go ←**
 A. I **B. Sr** closest to bottom left on P. Table C. Mg D. P E. F
- ___ 3. Which statement is true? **Energy and frequency are directly related, wavelength is inverse**
A. as energy decreases, wavelength increases
 B. as energy increases, wavelength increases
 C. as energy decreases, frequency increases
 D. as frequency increases, wavelength increases
 E. none of these statements are true
- ___ 4. Which ion is **not** isoelectronic with Ne?
 A. F⁻ B. O²⁻ C. Mg⁺² **D. K⁺ 18 e- = Ar** E. N³⁻
- ___ 5. Which statement is **not** correct?
 A. An ionic bond involves the transfer of electrons from the metal cation to the nonmetal anion. **T**
 B. For polar covalent bonds, the electrons are not shared equally by the two nonmetal atoms. **T**
C. The atom closer to F will be the positive end of the dipole for a polar covalent bond. F
 D. Metals lose electrons to form cations and nonmetals gain electrons to form anions. **T**
 E. A molecule containing polar bonds may be nonpolar if the polar bonds cancel. **T**
- ___ 6. Arrhenius bases release this ion in water:
 A. H⁺ **B. OH⁻** C. O²⁻ D. H⁻ E. OH⁺
- ___ 7. Which reactant is the Bronsted Lowry base? $\text{NH}_3(\text{aq}) + \text{HBr}(\text{aq}) \rightarrow \text{NH}_4^+(\text{aq}) + \text{Br}^-(\text{aq})$
A. NH₃ gains H⁺ ion B. HBr C. NH₄⁺ D. Br⁻
- ___ 8. An acidic solution will have a pH of:
A. Less than 7 B. equal to 7 C. greater than 7
- ___ 9. Which of the following ionic compounds is insoluble in water? **Use solubility rules on PT**
 A. Ba(OH)₂ **B. PbCl₂** C. KBr D. Al(NO₃)₃ E. SrS
- ___ 10. Which of the following is a strong electrolyte? **Strong acid, strong base or soluble ionic**
A. H₂SO₄(aq) strong acid B. HC₂H₃O₂(aq) C. AgCl D. CH₄ E. MgS
- ___ 11. Which picture below represents a weak acid solution?



Part Two. Short answer Questions.

- How many orbitals are in the second energy level? (2 pts) **one s and three p = 4**
- What is the maximum number of electrons that a d sublevel can hold? (2 pts) **10**
- How many valence electrons does Si have? (2 pt) **4**
- What is the charge for a Group VIA nonmetal ion? (2 pt) **-2**
- What is the total number of valence electrons for a sulfate ion, SO_4^{2-} ? (2 pt) **30 + 2 = 32**
- Write the **element** symbol that fits each of the following descriptions: (4 pts)
 - The alkali metal in the fourth period. **Group IA element in 4th row** **K**
 - The halogen (**VII A**) with the highest electronegativity value. **F has highest EN value!** **F**
- Which is larger? (2 pts) Mg or Mg^{2+} **Mg (cations are smaller since they have less e-'s).**
- Write the full electron configuration for Al^{3+} . (3 pts) **13 - 3 = 10 e-** **1s²2s²2p⁶**
- Write the full electron configuration for S. (5 pts) **16 e-** **1s²2s²2p⁶3s²3p⁴**
- For the following molecules: Draw the Lewis electron dot formula and answer the questions below. (Refer to the molecular geometry table.) (16 pts)

A. N F_3

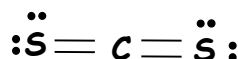


5 + 2(7) = 26 valence e-; AB₃E

Molecular shape: **Trigonal pyramid**

Polar or nonpolar? **polar**

B. C S_2



4 + 2(6) = 16 valence e-; AB₂

Molecular shape: **linear**

Polar or nonpolar? **nonpolar**

- Please circle the correct answer for each of the following (6 pts):
 - The bonds in Ni_3P_2 are **ionic** polar covalent nonpolar covalent metallic
Ni - P = metal/nonmetal
 - The O-F bonds in OF_2 are ionic **polar covalent** nonpolar covalent metallic
O-F = different nonmetals
 - The bonds in Br_2 are ionic polar covalent **nonpolar covalent** metallic
Br-Br = same nonmetal
- What is the formula for a compound formed by combining Al and S ions? (2 pts) **Al⁺³S⁻² = Al₂S₃**

13. Write the correct name for the given formula. (14 pts)

A. $\text{Ba}(\text{NO}_3)_2$	barium nitrate
B. CuO	opper (II) oxide
C. Na_3P	sodium phosphide
D. $\text{Mn}_2(\text{CO}_3)_3$	manganese (III) carbonate
E. P_2S_5	diphosphorus pentasulfide

14. Give the chemical formula for the compound. (12 pts)

A. magnesium phosphate	$\text{Mg}^{2+}\text{PO}_4^{-3} = \text{Mg}_3(\text{PO}_4)_2$
B. silicon tetrafluoride	SiF_4
C. nickel (II) sulfite	$\text{Ni}^{+2}\text{SO}_3^{-2} = \text{NiSO}_3$
D. iron (III) chloride	$\text{Fe}^{+3}\text{Cl}^- = \text{FeCl}_3$

15. What is the formula for nitric acid? (2 pts) **HNO_3**

16. Is C_5H_{12} a covalent compound or ionic compound? (2 pts) **Covalent**

Bonus (circle true or false for each statement): (1 pt each)

True or **False**? When a bond is broken, heat energy is released.

True or False? The bond length for a covalent bond is less than the sum of the two atomic radii.

	Max Pts
Page 1. Multiple Choice	22
Page 2.	48
Page 3.	30
Bonus	2
Total Pts	102