General Chemistry Chapter 2 Pre-Test

Essays

1.) (16 pts total, 4 pts each) 8-10 Briefly answer each of the following essay questions. (The actual test will contain 8 to 10 of these questions.)

a) Describe the three main tenets of Dalton's atomic theory.

- Atoms are indivisibles
- atoms of elements are the same. Elements of different atoms are different.
- matter cannot be created or destroyed.

b) In Rutherford's experiment, why did most of the positively charged alpha particles travel through the thin gold foil sheet? What two main characteristics of an atom did these experiments prove?

Atoms are mostly empty space!
Nucleus is positively charged, dense.

c) Why are the atomic masses of some elements non-whole numbers?

Isotopes mean take the average.

d) Which subatomic particle contributes most to the reactivity of an atom or compound? What do we specifically call this location?

electrons — valence electrons

e) Describe what is meant by the "octet rule".

Atoms requires 8 valence electrons to achieve stability.

2.) (10 pts total, 0.5 pts each) Using the periodic table, provide the atomic mass, atomic number, and complete profile of subatomic particles for each. Please round to the nearest whole number when necessary.

$p^+ + n^0$ Big Small

Atom	Atomic Mass	Atomic Number	Protons (p^+)	Neutrons (n^0)	Electrons (e^-)
Potassium	39.098	19	19	20	19
Iron	55.845	26	26	30	26
Cadmium	112.41	48	48	64	48
Arsenic					

3.) (12 pts total, 6 pts each) Draw the electron distribution for each of the following neutral atoms. Include the number of protons and neutrons in the appropriate place. Draw an arrow where the atom could form a bond.

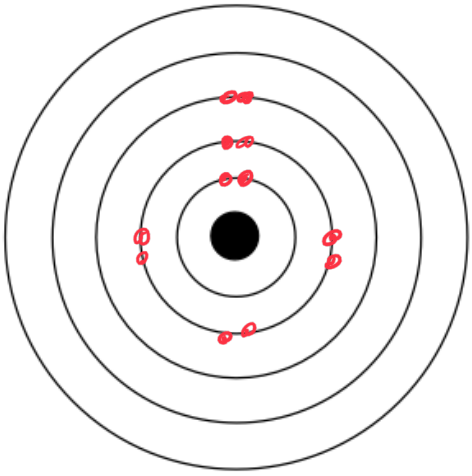
a) Magnesium

24.305 ← atomic mass

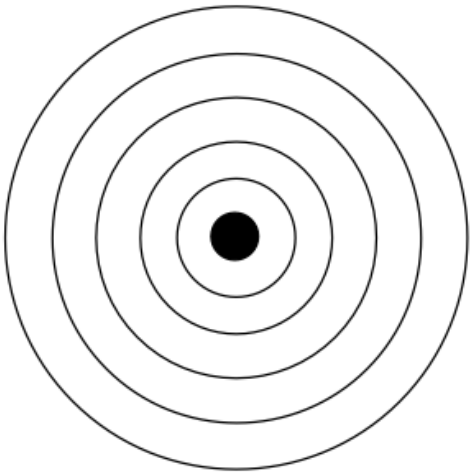
Mg

12 ← atomic number

12e⊖

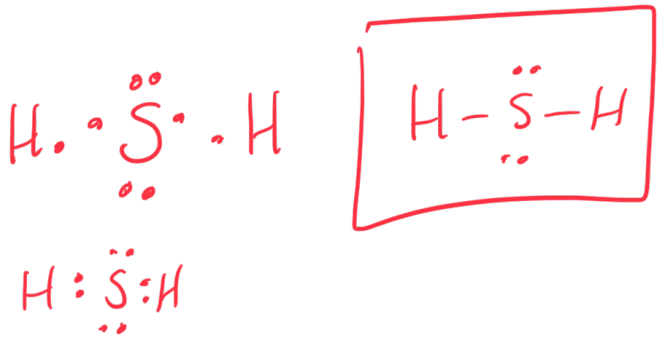


b) Sulfur



4.) (8 pts total, 4 pts each) Draw the structural form of each molecule, starting first with individual electron distribution diagrams (Lewis Structures).

a) H_2S



b) $CHCl_3$

5.) (8 pts total, 4 pts each) Write the empirical formula for each of the following:

a) $C_5H_{10}O_5$ common factor 5

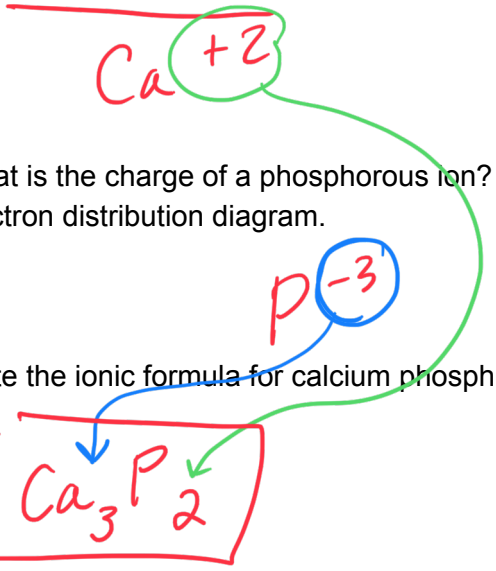
CH_2O

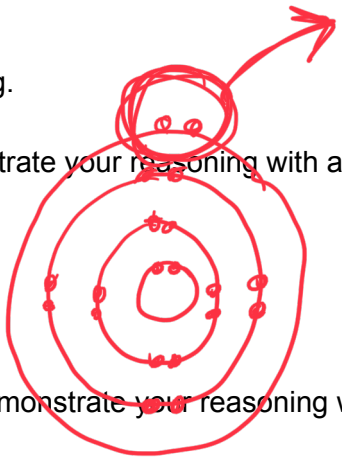
b) $C_8H_{14}O_2$ common factor 2

C_4H_7O

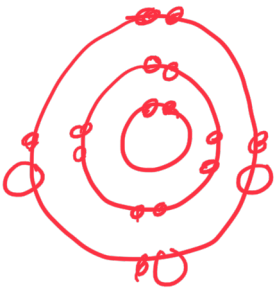
6.) (12 pts total, 4 pts each) Answer each of the following.

a) What is the charge of a calcium ion? Demonstrate your reasoning with an electron distribution diagram.





b) What is the charge of a phosphorous ion? Demonstrate your reasoning with an electron distribution diagram.



c) Write the ionic formula for calcium phosphide.

7.) (16 pts total, 4 pts each) Write the ionic formula for each of the following:

a) Potassium sulfide

b) Sodium bromide

c) Magnesium fluoride

d) Barium nitride

8.) (8 pts total, 1 pt each) Provide the molecular or ionic formula for each of the following compounds:

a) nitrogen tribromide

b) aluminum sulfate

c) trihydrogen monophosphide

d) magnesium hydroxide

e) mercury (II) nitrate

f) dinitrogen trioxide

g) iodine pentafluoride

h) sodium bicarbonate

9.) (10 pts total, 1 pt each) Provide the proper name for each of the following molecular formulas.

a) $(NH_4)_2SO_4$

b) Si_2Br_6

c) P_4S_5

d) $MgCO_3$

e) Li_3PO_4

f) NO_5

g) $Mg(NO_3)_2$

h) $FeCl_3$

i) NF_3

j) $Cu(OH)_2$