Chem I Name_____

Chem Semester I Final Review

(This will help your studying. There may be different kinds of questions on the final.)

1a. Give an example of a physical change. _____

Give an example of a chemical change. _____

1b. Give an example of a homogeneous mixture. _____

Give an example of a heterogeneous mixture. _____

2a. Give an example of an observation. _____

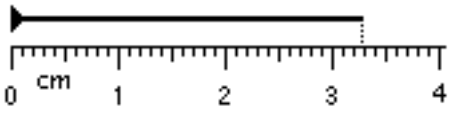
Give an example of an inference. _____

2b. What are three things that indicate a chemical change? _____

_____

2c. List the metalloids (names and symbols) _____

_____

3a. What is the appropriate measure of this nail? 

_____

3b. How many sig figs are in each of the following?

a) 250 ____ b) 201____ c. 0.003 _____ d. 1.0030 _____ e. 2.50×10^3 _____

3c. Add .00564 and 21.307, answering with the correct number of sig figs. _____

3d. Multiply .00564 and 21.307, answering with the correct number of sig figs. _____

4a. By definition, 12 inches equals one foot, 3 feet equals one yard, and 5,280 feet equals one mile. How many inches are in 4,672 yards? _____

4b. How many miles are 389.6 inches?_____

5a. Calculate and answer in the standard form of scientific notation with the right sig figs:

$$\frac{9.76 \times (2.50 \times 10^3) \times (1.05 \times 10^{-6}) \times 5.921}{(8.333 \times 10^{-7}) \times (2.3 \times 10^2)} = \_\_\_\_\_$$

6a. The density of mercury is 13.546 g/mL. There are 453.6 grams in 1.000 pounds. 16.000 cups equals 3.7854 liters. How much would 3.50 cups of mercury weigh in pounds? _____

6b. One cow is worth seven pigs. Three chickens are worth five rabbits. Nine rabbits are worth four pigs. How many cows could you get with thirty-seven chickens? (Answer with three sig figs.) _____

7a. The density of water is 1.00 g/mL. How many liters would 100. pounds of water be? _____

8a. Convert 25.0 mph to feet per second. _____

8b. Convert .00459 cubic miles to cubic inches. _____

9a. What was "science" to each of the following?

a. Pre-Greeks _____

b. Greeks _____

c. Alchemists _____

10. a. Who named the atom? _____

b. Who claimed matter is made of earth, wind, fire, and water? _____

c. Who disproved phlogiston? _____

d. Who gave us the current atomic theory? _____

e. Who discovered the electron? _____

f. Who discovered the nucleus? _____

g. Who discovered the neutron? _____

11. Use a periodic table to determine the number of

a. protons in silver _____ b. neutrons in gold _____

12. a. What is Avagadro's Number? _____

b. What is the other name for Avagadro's number? _____

13a. What are the three kinds of radioactive rays, and what can stop them? _____

_____

13b. How many protons, neutrons, and electrons are in $^{199}_{50}\mathrm{Sn}$? _____

14a. If an element of U-235 loses an alpha particle, what will it be? _____

15a. What's the difference between nuclear fission and nuclear fusion? _____

_____

15b. $^{1}_{0}\mathrm{n} + {}^{239}_{94}\mathrm{Pu} \text{ ---> } \_\_\_\_ + {}^{97}_{40}\mathrm{Zr} + 2\left({}^{1}_{0}\mathrm{n}\right)$

16. a. How many atoms would there be in 4.67 moles of silver? _____

b. How many atoms would there be in 0.556 grams of calcium metal? _____

c. Diamonds are pure carbon. If someone gave you a diamond made of 456 billion carbon atoms (that's 9 zeros), how much would it weigh in grams? _____

17a. What is the difference between the Bohr model of the atom and the Schroedinger model of the atom? _____

_____

_____

18a. What was the major contribution of each of these?

Planck: _____

Einstein: _____

Bohr: _____

Heisenberg: _____

deBroglie: _____

Schrodinger: _____

19a. What's the electronic configuration of xenon (without a noble gas shortcut)?

_____

20a. What's the electronic configuration of Bohrium (<u>with</u> the noble gas shortcut)?

_____

21a. What are valence electrons and why are they important? _____

_____

22b. How many valence electrons are in each of the groups of the periodic table? _____

_____

23a. How does atomic size change as you go

a. across the periodic table (left to right)? _____

i. Why? _____

b. down the periodic table (top to bottom)? _____

i. Why? _____

24a. What charge will each of the following ions have?

Na: _____ Al: ____ O: _____ Sr: _____ N: _____ Ga: _____ Br: _____ Li: _____

25b. Why do atoms become ions? _____

_____

26a. When dealing with monatomic ions, what do Roman numerals mean? _____

_____

b. When do you use them? _____

_____

c. When do you NOT use them? _____

_____

27b. Name these. Use Roman numerals when necessary.

a. $AlCl_3$ _____

b. SnS_2 _____

c. Fe_2O_3 _____

d. YN_2 _____

28. Give the formula for magnesium nitride _____

a)How much would one mole of this weigh in grams?_____

29. Give the formula for gallium oxide _____

a)How much would one mole of this weigh in grams?_____

30. Give the formula for. manganese III iodide _____

a)How much would one mole of this weigh in grams?_____

31. What does the roman numeral in the above question represent? _____

_____

32. What is electronegativity? _____

_____

33. What atom has the greatest electronegativity? _____ The least? _____

34. Bond types: What range of electronegativity differences correspond with bonds that are

non-polar covalent _____ polar covalent _____ ionic _____

35. Here are a few electronegativities: B = 2.0, C = 2.5, N = 3.0, O = 3.5, Br = 2.8, Be = 1.5, H = 2.1, Br = 2.8, Cl = 3.0, F = 4.0, S = 2.5

Complete another chart here:

Bond	Electronegativity Difference	Bond Type	∂+ atom	∂- atom
Be - O				
N - O				
C - Br				
N - Be				

36. What is the octet rule? _____

37. What are the three exceptions to the octet rule, and how many electrons do they need to be stable?

_____, _____, _____

38. Determine the number of valence electrons in each of the following molecules and draw their Lewis structures. Label which atoms are ∂- and ∂+ (use the electronegativities listed in question # 6). Then Identify their geometric shape (linear, trigonal planar, etc.).

HBr _____ N_2 _____ CH_4 _____

_____ _____ _____

NCl_3 _____ CO_2 _____ BF_3 _____

_____ _____ _____

H_2O _____ H_2O_2 _____ BeH_2 _____

(no name for shape)

_____ _____ _____

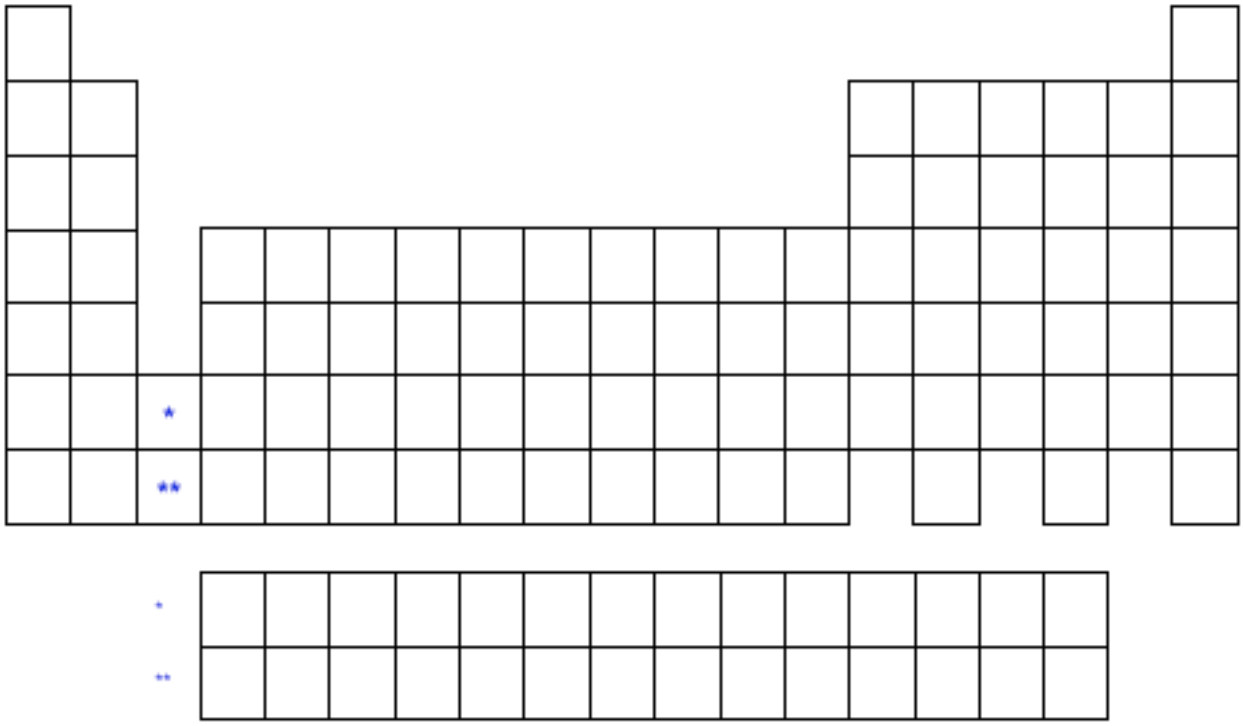
OH^- _____ NH_4^+ _____ SO_4^{-2} _____

_____ _____ _____

39. Show the two resonance forms of ozone (O_3).

40. Show two isomers of $C_2F_2Cl_2$. In each case the carbons should be in the middle and double bonded to each other.

41. Use colored pencils to label the periodic table as follows: Outline the noble gases dark blue, the alkaline earth metals yellow, the halogens red, the alkali metals green, the metalloids orange, and the transition metals brown. Shade all the metals that need Roman numerals when named as ions light blue. Label the groups with the charges they form as ions. Also label the groups according to the number of valence electrons each group has. Finally, put a number 1 in the most common element in the air you're breathing..



Answers to some of the math type questions

3a. 3.28cm or 3.29cm
3b. 2,3,1,5,3
3c. 21.313
3d. 0.120
4a. 168,200 in
4b. .006149 miles
5a. 7.9×10^2
6a. 24.7 pounds
6b. 3.92 cows
7a. 45.4 L
8a. 36.7 ft/sec
8b. 1.17×10^{12} in^3
11 a. 47 protons
b. 118 neutrons
14a. $^{219}_{85}\mathrm{At}$
15b. $^{141}_{54}\mathrm{Xe}$
16a. 2.81×10^{24} atoms
16b. 8.35×10^{21} atoms
16c. 9.10×10^{-12} grams