1ST SEMESTER PRACTICE FINAL

1. Draw a phase diagram and label all points and transitions.
2. Define the following:
    a. Mixture
    b. Matter
    c. Atom
    d. Element
    e. Molecule
3. Name all of the diatomic elements.
4. Draw the electron diagram then determine the <u>valence electrons</u>, <u>core electrons</u> AND identify the <u>period</u> and <u>group</u> numbers they belong in for each of the following:
    a. Carbon
    b. Oxygen
    c. Cobalt
    d. Argon
    e. Krypton
    f. Potassium
5. Draw the Lew Dot Structure, list the number of <u>lone pairs</u> of elections, <u>single</u>, <u>double</u>, and <u>triple</u> bonds:
    a. BrF_3
    b. CH_4
    c. $BeCl_2$
    d. H_2O
    e. PCl_5
    f. CH_2I_2
    g. PH_3
    h. SF_4
6. If 55 kJ of energy were added to a pool of ethanol at its boiling point, what would be the mass of gaseous ethanol produced?
7. List properties that elements in the same GROUP have in common.
8. List properties that elements in the same PERIOD have in common.
9. Write the ionic formula for the following:
    a. Aluminum oxide
    b. Sodium sulfide

10. Name the following compounds:
    a. CaF_2
    b. Cu_3N_2
11. Write the formula for:
    a. Ammonium carbonate
    b. Iron (III) chloride

Density of substances at 20°C

Substance	Density (g/mL)	Substance	Density (g/mL)
Helium gas	0.00016	Table salt	2.16
Dry air	0.001185	Aluminum	2.70
Gasoline	0.66-0.69	Iron	7.87
Kerosene	0.82	Copper	8.96
Benzene	0.880	Silver	10.5
Water	1.000	Lead	11.34
Carbon tetrachloride	1.595	Uranium	19.05
Magnesium	1.74	Gold	19.32

12. Use the density table above to answer the next four (a-d) questions:
    a. What would be the expected volume of 7.85 grams of lead?
    b. An unknown substance was measured to have a mass of 4.48 kg and a volume of 4.27 dL. If it was a pure substance, what would it most likely be?
    c. What would be the mass of 25 liters of dry air?
    d. Jade calculated the density of pure water to be 1.028 g/mL, what would be her percent error?
13. Place the following scientists in order and explain their major contribution to chemistry:
    a. Rutherford
    b. J. J. Thompson
    c. Milikan
    d. Bohr
    e. Heisenberg

14. What are the three states of matter? Which ones are:
    a. Rigid
    b. Have fixed shapes
15. What is the atomic mass of vanadium with 29 neutrons?
16. What is the name of the family in each of the following groups? Explain if they are stable, metals or non-metals.
    a. Group 1
    b. Group 2
    c. Groups 3-12
    d. Group 17
    e. Group 18
17. What is the trend in the atomic radii as you move from left-to-right across a period?
18. Explain the cause for the trend in question 17. Why does the radius change?
19. What causes the radius to change as you move down a group?
20. Define a closed system.
21. What do n, l, m_l, and m_s represent in quantum chemistry?
22. In a set, which quantum numbers can be the same (n, l, m_l, and/or m_s)?
23. Place the following measurements in order from least precise to most precise: 32.1 g; 10,000 g; 0.023 g; 173.6 g