General Chemistry Chapter 1 & 2 Pre-Test

Essays

1.) (20 pts total, 2-2.5 pts each) 8-10 Briefly answer each of the following essay questions. (The actual test will contain 8 to 10 of these questions.)

a) Explain the difference between qualitative and quantitative data? What are the uses or advantages of both?

b) What is a hypothesis? What is an important determinant of a good hypothesis? Describe the transition from hypothesis to theory.

c) What is the difference between a substance and a mixture? Give an example of each.

d) What is the difference between a homogeneous mixture and a heterogeneous mixture? Give an example of both.

e) What are the three states of matter? Describe the three states of matter with respect to the proximity and movement of particles.

f) What is the fundamental difference between a chemical and physical property? Give at least one example of both.

g) What is the difference between an extensive property and an intensive property? Provide examples of each. Which presents a better way to identify a substance?

h) What is the difference between mass and weight?

i) What does temperature actually measure?

j) What is the basis of the celsius temperature scale? What is the basis of the kelvin temperature scale?

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

l) 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?

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

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

o) Describe what is meant by the “octet rule”.

2.) (4 pts total, 0.5 pts each) Complete the following table

Base Quantity	Name of Unit	Symbol
	meter	
mass		
		s
temperature		

3.) (6 pts total, 2 pts each) Solve each of the following density problems.

a) If the density of a compound is 8.62 g/mL and the volume is 12.2 mL, find its mass? (Be mindful of significant digits)

b) If the volume of a compound is 84.3 mL and the mass is 36.8 g, what is the density of the compound? (Be mindful of significant digits)

c) If the mass of a compound is 48.7 g and its density is 13.6 g/mL, what is the volume of the sample? (Be mindful of significant digits)

4.) (8 pts total, 2 pts each) Convert the following temperatures:

a) 350 K into °C (Be mindful of significant digits)

b) 104 °F into °C (Be mindful of significant digits)

c) 85.0 °C into °F (Be mindful of significant digits)

d) 53 °C into K (Be mindful of significant digits)

5.) (9 pts total, 3 pts each) Use your knowledge of dimensional analysis and life to answer the following related questions:

a) The longest home run hit in major league baseball this season was 486 feet. Approximately how many centimeters did the ball travel?

b) According to its website, Netflix contains approximately 125,000,000 hours of programming at any given time. How many years would it take an individual to watch the current Netflix library of content?

c) Nate has a problem. Recently, Nate (and the rest of the country) discovered the Popeye's chicken sandwich. According to nutritional data offered on the website, a chicken sandwich and fries combo meal contains 1004 calories. While Nate wants to fend off excess weight gain until the holiday season, he cannot help but eat five of these combo meals a day. If he burns 363 calories for every 30 minutes of running, how long will he need to run every day to keep his slim physique?

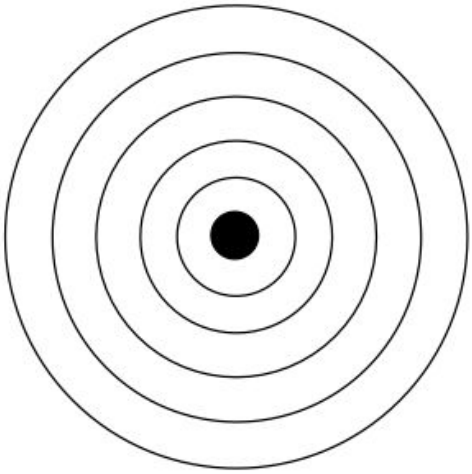
6.) (10 pts total, 0.5 pts each) Using the periodic table, provide the atomic mass, atomic number, and complete profile of subatomic particles for each. Please round to the nearest whole number when necessary.

Atom	Atomic Mass	Atomic Number	Protons (p^+)	Neutrons (n^0)	Electrons (e^-)
Potassium					
Iron					
Cadmium					
Arsenic					

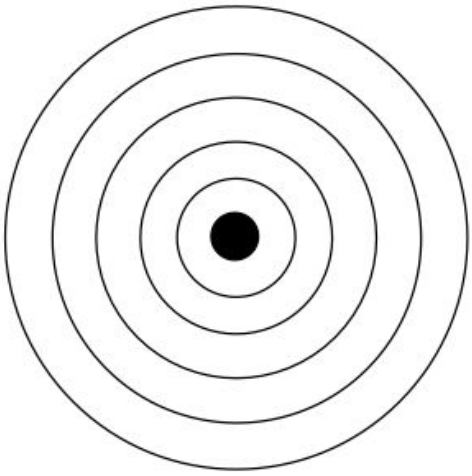
7.) (2 pts total) The structure of deoxyribonucleic acid (DNA) utilizes an extended phosphodiester backbone about its vertical axis. If a scientist wanted to replace the central phosphorous in the backbone with another element, which one could he potentially use? Explain your reasoning.

8.) (8 pts total, 4 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



b) Sulfur



9.) (6 pts total, 3 pts each) Draw the structural form of each molecule, starting first with individual electron distribution diagrams (Lewis Structures).

a) H_2S

b) $CHCl_3$

10.) (4 pts total, 2 pts each) Write the empirical formula for each of the following:

a) $C_5H_{10}O_5$

b) $C_8H_{14}O_2$

11.) (6 pts total, 2 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.

12.) (8 pts total, 2 pts each) Write the ionic formula for each of the following:

a) Potassium sulfide

b) Sodium bromide

c) Magnesium fluoride

d) Barium nitride

13.) (4 pts total, 0.5 pts 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

14.) (5 pts total, 0.5 pts 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) $Cu(OH)_2$