

Chemistry 1210 Test 1 Fall 1999, Jordan

Name _____

ID _____

By submitting this test, I certify that I have received no help on this quiz from any other person or used any unauthorized material.

Please show all work near the relevant question when applicable. Failure to show work will result in partial or total deduction of points. Remember, significant figures count.

Helpful formulas and conversion factors: mass/volume, moles/liters, $^{\circ}\text{F} = 1.8(^{\circ}\text{C}) + 32$, $\text{K} = ^{\circ}\text{C} + 273$, $1\text{lb} = 0.454\text{ kg}$, $1\text{oz} = 28.4\text{ g}$

(1) List 4 of the SI base units and give the property they measure and list two derived units and the property measure.

(2) Two samples containing only hydrogen and oxygen were analyzed. Sample A was found to contain 4.10 g of carbon and 10.9 g of oxygen. Sample B was found to contain 6.00 g of carbon and 16.0 g of oxygen. What law is demonstrated by these two compounds (show work)?

(3) What did Dalton propose in his Atomic Theory? How does this lead to the Law of Conservation of Mass?

(4) What part of Dalton's Atomic Theory did J.J. Thompson disprove and how did he do it?

(5) Classify the following as a compound, element or a mixture. If it is a mixture, classify it as heterogeneous or homogeneous (solution).

(a) sulfur

(b) a plate of french fries with ketchup.

(c) distilled water

(d) window cleaner

(6) Name the following compounds

(a) $\text{Li}_2(\text{HSO}_4)$

(b) $\text{Co}(\text{Cl})_2$

(c) SCl_2

(d) BaS

(7) Write the formulas of the following compounds from their names

(a) chromium (III) oxide

(b) phosphorus tribromide

(c) magnesium nitrate

(c) carbon disulfide

(8) An unknown compound found in mothballs was sent for analysis. The results found that the compound was 93.70% C by mass and 6.30% H by mass.

(a) What is the empirical formula for the compound

(b) A mass spectrum of the unknown compound consisted mainly of a peak with mass 128 and no peaks to higher mass. What is the formula for the unknown.

(9) Frozen carbon dioxide (dry ice) has a temperature of $-78\text{ }^{\circ}\text{C}$. Convert this temperature to

(a) K

(b) $^{\circ}\text{F}$

(10) A can of coke contains 355 mL of fluid. If the density of the drink is 1.0 g/mL, express the contents of the can in

(a) g

(b) kg

(c) oz

(11) Archimedes put a crown in water to determine its density. If he put a crown into a large graduated flask and the water rose from 10.25 L to 11.60 L and the mass of the crown is 15,500 g (15.5 kg).

(a) What is the density of the crown.

(b) If the density of gold is 19.31 g/mL, is the crown pure gold?

(12) List the number of protons, neutrons, and electrons for each of the following species

(a) ^{57}Fe

(b) ^{79}Br

(c) ^{235}U

(d) $^{23}\text{Na}^+$

(13) If the natural abundances of carbon were ^{12}C (67.00 %, mass = 12.00 amu) and ^{14}C (33.00%, mass = 14.00 amu), what would be the atomic mass for carbon listed on the periodic table (these are not the actual abundances).

(14) What type of bonding is present in following species (ie ionic and covalent bonding)

(a) Li_2S

(b) H_2O

(c) LiClO_4

(d) N_2O_4

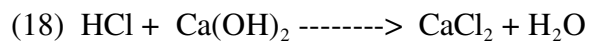
(15) $\text{C}_3\text{H}_8 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$

(a) Balance the formula above and write it below.

(b) If 15.0 moles of C_3H_8 is burned, how much O_2 is required (in moles and grams)?

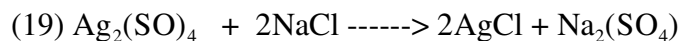
(16) If 15.0 moles of C_3H_8 is reacted with with 112 g of O_2 (the equation in problem 15), how much CO_2 will be produced?

(17) If a 675 mL solution of HCl has a concentration of 0.235 M, how much HCl (in moles and grams) is in the solution?



(a) If all of the solution of HCl from problem 17 (all 675 mL of it) was needed to neutralize a 1.00 L solution of Ca(OH)_2 (in a titration), how much Ca(OH)_2 was there in the unknown solution (in moles)?

(b) What was the concentration of the original 1.00 L solution of Ca(OH)_2 ?



If 1.00 mole of $\text{Ag}_2(\text{SO}_4)$ and 2.00 moles of NaCl are mixed,

(a) what is the theoretical yield of AgCl (in moles)

(b) if 1.80 moles of AgCl are recovered, what is the yield in %?

(20) In football, the field is 1.00×10^2 yards (3 feet to a yard) from goaline to goaline. Teams must move the ball 10 yards (2 sig figs) to get a 1st down.

(a) convert the distance from goaline to goaline (1.00×10^2 yards) to meters.

(b) convert the distance needed for a 1st down (10 yards (2 sig figs)) to km.

Bonus Question:

What was Lavoisier's definition of an acid? Arrhenius' definition of an acid and a base?
The Brønsted-Lowry definition of acid and base?