Semester Exam Review – Short Answer

Section 1A

1) List the following numbers in scientific notation:

a) 405000	c) 30.1
b) 0.00008190	d) 1.902

2) Perform the following functions and list the answer with the proper number of significant figures
a) 14.6 + 98.23
b) 79.904 / 12.3
c) 1.456 - 0.92
d) 17.9 x 0.0021

3) Perform the following conversions:

a) How many gallons are there in a gas tank that holds 62.0 L?

b) How many cm are in a distance of 0.015 km?

c) How many m are in a distance of 32.0 miles?

Section 1B

4a) What is the density of a liquid that has a mass of 14 g and a volume of 6.5 ml?
4b) How many grams is a rectangular piece of aluminum that has a density of 2.7 g/cm³ and has the dimensions of 16 cm by 8 cm by 2 cm?

5) For each of the following substances, determine the name if given the formula or the formula if given the name.

a) Na ₃ PO ₃	e) potassium nitride
b) SrCl ₂	f) gold (I) sulfate
c) CoO	g) aluminum nitrite
d) Cu ₃ (BO ₃) ₂	h) ammonium sulfide

Section 1C

6) 30 g of water is used to dissolve 14 g of sugar. What is the solution concentration in pph?

7) How many grams of sugar are in 400 g of a 6 pph sugar solution?

Section 2A

8) An unknown element X has the following isotope data:

Isotope	Mass (amu)	Percent Abundance	
⁵⁸ X	57.935	68.1	
⁶⁰ X	59.931	26.2	
⁶¹ X	60.931	1.14	
⁶² X	61.928	3.63	
⁶⁴ X	63.927	0.926	

What is the average atomic mass for element X and identify element X by its mass.

9) Identify the following elements:

a) $1s^22s^22p^63s^23p^64s^23d^{10}4p^65s^24d^{10}5p^66s^1$

b) [Rn]7s¹5f¹⁴

c) $[Ar]4s^23d^6$

d) n=5, L = 1, m = -1, s = +1/2

Section 2C

10) Calculate the volume of a balloon filled with 15.0 g of NO_2 at STP.

11) Calculate the number of moles of 76.1 g SO_2 .

12) An 11.78 g sample of an unknown compound is decomposed and analyzed. The procedure produces 0.36 g of H, 3.73 g of P and 7.69 g of O. Determine the percent composition of hydrogen in the compound.

13) What is the percent of oxygen by mass in water?

14) A sample of ammonia (NH_3) contains 7.22 moles of ammonia. How many molecules of ammonia are in the sample?

15) What is the mass of 2.0 mol of CuCl₂?

16) A substance is analyzed and determined to be made up of 69.4 % carbon, 4.13 % hydrogen, and 26.4 % oxygen. The molar mass of the substance is found to be 242 g/mol.

a) What is the empirical formula for the substance?

b) What is the molecular formula for the substance?

Section 2D

17) How many liters of ammonia gas would be produced by 3.00 grams of magnesium nitride, according to the reaction $Mg_3N_2 + 6 H_2O --> 3 Mg(OH)_2 + 2 NH_3$?

18) Solid iron (II) sulfide reacts with aqueous hydrochloric acid (HCl) to produce hydrogen sulfide gas and a solution of iron (II) chloride. How many grams of hydrochloric acid must react to produce 2.50 L of hydrogen sulfide at STP?

19a) When CH_4 burns in the presence of oxygen, it produces CO_2 and H_2O . What mass of water would be made from 4.25 g of CH_4 ?

b) If 9.05 g of water is recovered when performing the lab, what is the percent yield of the lab?

20) Copper is made by mixing aqueous copper (II) chloride with solid aluminum. If a solution containing 32.4 g of copper (II) chloride is mixed with 5.00 g of aluminum powder, how many grams of copper would be produced?

Answers:

1a) 4.05 x 10 ⁵ 2a) 112.8 3a) 16.4 gal	1b) 8.190 x 10 ⁻⁵ 2b) 6.50 3b) 1500 cm	1c) 3.01 x 10 ¹ 2c) 0.54 3c) 51500 m	1d) 1.902 x 10º 2d) 0.038
4a) 2.2 g/mL 5a) sodium phosphite 5d) copper (II) borate 5h) (NH ₄) ₂ S	4b) 691 g 5b) strontiur 5e) K ₃ N	n chloride 5c) co 5f) Au ₂ SO ₄	obalt (II) oxide 5g) Al(NO ₂) ₃
6) 31 pph	7) 24 g sugar		
8) 58.69, nickel 9a) cesium	9b) mendelevium	9c) iron	9d) tellurium
10) 7.30 L 14) 4.35 x 10 ²⁴ molec	11) 1.19 mol ules 15) 20	12) 3.1 % H 59 g	13) 88.9 % O 16) C7H5O2, C14H10O4