Practice Test - Chapter 1

Part 1. Solve each of the following. Give your answers using the correct number of significant figures. (3 points each)

44.010	a. 12.011 + 31.9988							
0.3564	b. 0.2884 x 1.2359							
0.16	c. $[(8.675 - 8.661) \div 8.675] \ge 100.$							
4.61 x 10 ¹⁴	d. $(2.9979 \times 10^8) \div (6.50 \times 10^{-7})$							
$3.550 \ge 10^{22}$	e. $11.50 \div 195.08 \text{ x} (6.022 \text{ x} 10^{23})$							
Part 2. Convert each of the following. (3 points each)								
3.69 x 10 ⁻¹	a. 3.69 milligrams to centigrams							
9.87 x 10 ⁷	b. 98.7 megahertz to Hertz							
6.50 x 10 ⁻⁷	c. $6.50 \ge 10^2$ nanometers to meters							
2.500	d. 2.500 x 10 ⁻⁹ kilograms to micrograms							
Part 3. Perform the following unit conversion	ons. All answers should have three significant figures. (3 points each)							
322000 centimeters	a. 2.00 miles to centimeters							
45.0 lbs	b. 20.4 kilograms to pounds							
37.5 torr	c. 5.00 kilopascals to torr							
296 K	d. 22.8° C to Kelvin							

Part 4. Solve the following using dimensional analysis. Show all of your work below each problem. Box your final answer. Answers should be given using three significant digits. (4 points each)

a. Gold atoms have an atomic radius of 1.46 Å (angstroms). How many gold atoms would have to be laid side by side to give a row of gold atoms 6'5" long?

77 inches x $\frac{2.54 \text{ cm}}{1 \text{ inch}}$ x $\frac{1 \text{ meter}}{100 \text{ cm}}$ x $\frac{1 \text{ x } 10^{10} \text{ Å}}{1 \text{ meter}}$ x $\frac{1 \text{ atom}}{2.92 \text{ Å}}$ = **6.70 x 10⁹ atoms**

b. At room temperature oxygen gas travels at 393.5 meters per second. Calculate how fast oxygen gas travels in miles per hour.

Part 5. Solve each of the following density problems. Show all work below the problem.

a. Diamonds have a density of 3.513 g/mL. The mass of diamonds is often measured in carats, 1 carat equaling 0.200 g. If a 2.50 carat diamond is dropped in 8.25 mL of water, what will be the new volume of the water and diamond? (3 points)

2.50 carats x $\frac{0.200 \text{ grams}}{1 \text{ carat}} = 0.500 \text{ grams}$

 $3.513 = \frac{0.500 \text{ grams}}{x}$ x = 0.142 mL

0.142 + 8.25 = 8.39 mL

- b. The water level in a graduated cylinder stands at 18.0 mL before and at 36.2 mL after a 56.74 g metal bolt is submerged in the water. (a) What is the volume of the bolt? (2 points) (b) What is the density of the bolt? (2 points) (c) What is your % error if the actual density of the metal in the bolt is 3.25 g/mL? (2 points)
 - i. 36.2 18.0 = **18.2 mL**
 - ii. 56.74 ÷ 18.2 = **3.12 g/mL**
 - iii $\underline{|3.25 3.12|} \ge 100. = 4.0\%$ 3.25

Part 6. Solve each of the following multiple choice questions. (2 points each)

1	substance?								
	a. an apple reacting with oxygen and turning brown			b. sublimation of iodine					
	c. melting 6.0 grams of sa	d. t	d. burning of coal						
2 Which of these is the percent of error in evaluating the molecular mass of a compound if the experimental value was 105.2 amu and the known value was 107.5 amu?									
I	a. 1.0%	b. 2.1%	c. 3.3%	d. 4.2%					
3 Which set of equipment would be most useful to determine the density of a liquid?									
	a. Balance and periodic table			b. Periodic table and thermometer					
	c. Balance and graduate	ed cylinder	d. Graduate	d cylinder and thermometer					
4	One serving of peanut butter	r is 36 grams. Whi	ch of the following is	the same value in kilograms?					
	a. 3.6×10^{-4}	b. 3.6×10^{-3}	c. 3.6×10^{-2}	d. 3.6×10^4					
5 Which of the following is NOT an intensive property?									
	a. malleablity		b. good conductor of heat						
	c. density of 3.4 g/mL		d. mass of 32.0 gran	ns					
6	_ Which of the following is ar	n extensive propert	y?						
	a. reacts with water		b. density of 3.0 g/m	L					
	c. melts at 424 K		d. mass of 10.0 gran	ns					
7	_ Which of the following mea	surements shows g	ood precision & good	accuracy, if the actual scientific					
value is 3.74 c	m?								
	a. 2.75 cm, 3.75 cm , 4.05	5 cm	b. 3.76 cm, 3.76 cm	, 3.75 cm					
	c. 4.02 cm, 4.02 cm, 4.01	cm	d. 4.52 cm. 4.78 cm,	3.01 cm					
8	_ Which separation technique	would be used by	someone stranded at s	ea to make salt water drinkable?					
	a. decanting	b. electrolysis	c. distillati	on d. chromatography					

9 How many total significant figures would the solution to the following calculation have?									
521.5 + 0.005 +	a. 4		b. 3		c. 2		d. 1		
10 Two solid objects are of equal volume, but object A has a density = X and object B has a density = $(0.5)(X)$. Which of the following is true concerning objects A & B?									
	a. Obje c. Obje	ct B has twice the ct A has one half	density of object A the mass of object	А. В.	b. Obj d. Obj	ects A & B j ect A has t	are of eq wice the	ual mass. mass of object B.	
11 Some bottles of colorless liquids were being labeled when the technicians accidentally mixed them up and lost track of their contents. A 15.0 mL sample withdrawn from one bottle weighed 22.3 g. Which of the following is the correct identity of the unknown liquid?									
	a. acetone, d=0.792 g/mL c. chloroform, d=1.489 g/mL			b. benzene, 0.899 g/mLd. carbon tetrachloride, d=1.595 g/mL					
12	The prop a. 0.565	er scientific notati 5 x 10 ⁹	ion for 565,000,00 b. 5.65 x 10 ¹¹	0,000 is	 c. 56.	.5 x 10 ¹¹	d. 565 x	x 10 ¹²	
13	Sublimation is an example of an: a. exothermic chemical change c. endothermic chemical change				b. endothermic physical change d. exothermic physical change				
14	The grap a. 7 x 1	hite in a mechanic 0 ³	cal pencil has a size b. 7 x 10 ⁻³	e of 0.7	millimet c. 7 x	ters. What $\frac{1}{2}$	is this va	lue in meters? d. 7 x 10⁻⁴	
 15 Many reactions are taken to completion by heating the reaction mixture in a test tube. Each of the following would be a safe practice <i>except</i> – a. heating the test tube gently to prevent the solution from boiling over b. pointing the test tube away from others so that no one is injured c. placing a stopper in a test tube to prevent gas from escaping d. holding the test tube with test tube clamps to avoid touching hot objects 									
16	How mar a. 5	ıy significant figu	res are there in 0.0 b. 3	090290	m? c. 7			d. 8	
17 A student measured the temperature of a boiling solution and found it to be 56.0°C at standard pressure. The theoretical temperature of that boiling solution is 55.0°C. What is the percent of error in the student's									
measurement.	a. 18%		b. 1.8%		c. 0.1	8%		d. 0.018%	
18 In order to determine the identity of a substance, a student listed the following properties. Which of the following is a chemical property?									
	a. Oxid c. Attra	lizes in air ction to a magnet		b. Con d. Diss	ducts ar solves in	n electric cu n water	rrent		
19	Which of a. subst c. subs	the following wo ance a, density 2.0 tance c, density 1	uld sink in water? 0 g/L .1 g/mL	b. subs d. none	stance b e of the	, density 0.7 above	7 g/mL		
Part 7. Identify each of the following as a compound, monoatomic element, or molecular element (1 point each)									
 compound molecular ele molecular ele 	ement ement	$\begin{array}{c} NO_2 \\ N_2 \\ O_3 \end{array}$		4. mon 5. com 6. mon	oatomi pound oatomi	c element c element	Ne NH3 Na		