

Name \_\_\_\_\_

Honors Chemistry

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**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.  $0.2884 \times 1.2359$

**0.16**

c.  $[(8.675 - 8.661) \div 8.675] \times 100.$

 **$4.61 \times 10^{14}$** 

d.  $(2.9979 \times 10^8) \div (6.50 \times 10^{-7})$

 **$3.550 \times 10^{22}$** 

e.  $11.50 \div 195.08 \times (6.022 \times 10^{23})$

Part 2. Convert each of the following. (3 points each)

 **$3.69 \times 10^{-1}$** 

a. 3.69 milligrams to centigrams

 **$9.87 \times 10^7$** 

b. 98.7 megahertz to Hertz

 **$6.50 \times 10^{-7}$** 

c.  $6.50 \times 10^2$  nanometers to meters

**2.500**

d.  $2.500 \times 10^{-9}$  kilograms to micrograms

Part 3. Perform the following unit conversions. 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?

$$77 \text{ inches} \times \frac{2.54 \text{ cm}}{1 \text{ inch}} \times \frac{1 \text{ meter}}{100 \text{ cm}} \times \frac{1 \times 10^{10} \text{ Å}}{1 \text{ meter}} \times \frac{1 \text{ atom}}{2.92 \text{ Å}} = \mathbf{6.70 \times 10^9 \text{ atoms}}$$

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

$$\frac{393.5 \text{ meters}}{\text{sec}} \times \frac{60 \text{ sec}}{1 \text{ min}} \times \frac{60 \text{ min}}{1 \text{ hour}} \times \frac{1.0936 \text{ yds}}{1 \text{ meter}} \times \frac{3 \text{ feet}}{1 \text{ yd}} \times \frac{1 \text{ mile}}{5280 \text{ ft}} = \mathbf{880. \text{ miles/hour}}$$

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)

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

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

$$0.142 + 8.25 = \mathbf{8.39 \text{ mL}}$$

- 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.  $36.2 - 18.0 = \mathbf{18.2 \text{ mL}}$

ii.  $56.74 \div 18.2 = \mathbf{3.12 \text{ g/mL}}$

iii.  $\frac{|3.25 - 3.12|}{3.25} \times 100 = \mathbf{4.0\%}$

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

1. \_\_\_\_\_ Which of the following is an example of a physical change to a pure substance?  
a. an apple reacting with oxygen and turning brown                      **b. sublimation of iodine**  
c. melting 6.0 grams of salt water    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?  
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 graduated cylinder**    d. Graduated cylinder and thermometer
4. \_\_\_\_\_ One serving of peanut butter is 36 grams. Which of the following is the same value in kilograms?  
a.  $3.6 \times 10^{-4}$                                       b.  $3.6 \times 10^{-3}$                                       **c.  $3.6 \times 10^{-2}$**                                       d.  $3.6 \times 10^4$
5. \_\_\_\_\_ Which of the following is NOT an intensive property?  
a. malleability                                      b. good conductor of heat  
c. density of 3.4 g/mL                                      **d. mass of 32.0 grams**
6. \_\_\_\_\_ Which of the following is an extensive property?  
a. reacts with water                                      b. density of 3.0 g/mL  
c. melts at 424 K                                      **d. mass of 10.0 grams**
7. \_\_\_\_\_ Which of the following measurements shows good precision & good accuracy, if the actual scientific value is 3.74 cm?  
a. 2.75 cm, 3.75 cm, 4.05 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 sea to make salt water drinkable?  
a. decanting                                      b. electrolysis                                      **c. distillation**                                      d. chromatography

