HW #1&2–1 Summer assignment (Chapters 1+2) Name_Numerical Answers_____

1.21 **Bromine is a reddish-brown liquid. Calculate its density (in g/mL) if 586 g of the substance occupies 188 mL.**

density = 3.12 g / mL

1.22 **The density of ethanol, a colorless liquid that is commonly known as grain alcohol, is 0.798 g/mL. Calculate the mass of 17.4 mL of the liquid.**

mass of ethanol = 13.9 g

1.35 **Carry out the following operations and express each answer with the correct units and with the correct number of digits.** *(Remember: Keep the least number of decimal places for addition and subtraction and keep the least number of significant figures for multiplication and division.)*

(a) **5.6792 m + 0.6 m + 4.33 m** = 10.6 m

(b) **3.70 g – 2.9133 g** = 0.79 g

(c) **(4.51 cm)(3.6666 cm)** = 16.5 cm

(d) **(0.00005 cm)(538 cm^2)** = 0.03 cm^3

1.36 **Carry out the following operations and express each answer with the correct units and with the correct number of digits.** *(Again-- Keep the least number of decimal places for addition and subtraction and keep the least number of significant figures for multiplication and division.)*

(a) $\dfrac{\textbf{7.310 km}}{\textbf{5.70 km}} =$ **1.28**

(b) **0.00326 mg –0.0000788 mg = 0.00318 mg = 3.18×10^{-3} mg**

(c) **$(0.402 \times 10^7$ dm) + $(7.74 \times 10^7$ dm)** = 8.14×10^7 dm

(d) **(220 cm)(34.0cm)(0.0456cm) = 341.088 cm^3 = 340 cm^3**

(e) $\dfrac{\textbf{(3.54 m - 0.14 m)}}{\textbf{28.2 s}} = \dfrac{3.40\text{ m}}{28.2\text{ s}} = 0.12057\text{ m/s} =$ 0.121 m/s

1.37 **Carry out the following conversions:**

(a) **22.6 m = ? dm** **226 dm**

(b) **25.4 mg =? Kg** **2.54×10^{-5} kg**

(c) **556mL = ?L** **0.556 L**

(d) **10.6 kg/m^3 = ? g/cm^3** **0.0106 g / cm^3**

1.39 **The average speed of helium at 25°C is 1255 m/s. Convert this speed to miles per hour.**

Helpful info: 1 mile = 1609 m

2808 mi / hr

1.41 How many minutes does it take for light to travel from the sun to the Earth?

Helpful info: The distance from the sun to Earth is 93 million miles(93 x 10^6 mi).
The speed of light = 3.00 x 10^8 m/s; 1 mile = 1609 m

8.3 min

1.49 Aluminum is a lightweight metal (density = 2.70 g/cm^3) used in aircraft construction, high-voltage transmission lines, beverage cans and foils. What is its density in kg/m^3?

2.70×10^3 kg / m^3

1.54 In determining the density of a rectangular metal bar, a student made the following measurements: length = 8.53 cm; width = 2.4 cm; height = 1.0 cm; mass = 52.7064 g. Calculate the density of the metal to the correct number of significant figures.

2.6 g/cm^3

1.79 Chalcopyrite, the principal ore of copper (Cu), contains 34.63 percent Cu by mass. How many grams of Cu can be obtained from 5.11×10^3 kg of the ore?

Hint: "34.63 percent Cu by mass" means that there are 34.63 kg of Cu in 100 kg of ore.

1.77×10^6 g Cu

1.81 A 1.0 mL volume of seawater contains about 4.0×10^{-12} g of gold. The total volume of ocean water is 1.5×10^{21} L. Calculate the total amount of gold (in grams) that is present in seawater, and the worth of the gold in dollars.

Assume gold costs $1300 per ounce (This was the price of gold in June 2019).
1 lb = 453.6 g; 1 lb = 16 oz

6.0×10^{12} g Au

$\$2.8 \times 10^{14}$ = 280 trillion dollars!!

1.83 The thin outer layer of Earth, called the crust, contains only 0.50 % of Earth's total mass and yet it is the source of almost all of the elements found on Earth. Silicon (Si) is the second most abundant element in Earth's crust (27.2 % by mass). Calculate the mass of silicon (in kg) in Earth's crust.

The mass of Earth is 5.9 × 10^{21} tons. 1 ton = 2000 lbs; 1 kg = 2.205 lbs

mass of Si in crust = 7.3×10^{21} kg Si

1.85 One gallon of gasoline in an automobile's engine produces on the average 9.5 kg of CO_2, which is a greenhouse gas. (It promotes the warming of Earth's atmosphere) Calculate the annual production of CO_2 (in kg) if there are 40 million cars in the United States and each car covers a distance of 5000 miles at a consumption rate of 20 miles per gallon.

9.5×10^{10} kg CO_2