

1. (A pound of coffee beans yields 50 cups of coffee (4 cups = 1 qt.) How many milliliters of coffee can be obtained from 1.5g of coffee beans? (5pts)

(Notes:

1 lb = 453.59g

1L = 1.0567 qt)

$$1.5g \times \frac{1lb}{453.59g} \times \frac{50cups}{1lb} \times \frac{1qt}{4cups} \times \frac{1L}{1.0567qt} \times \frac{1mL}{10^{-3}L} =$$

$$\boxed{39mL}$$

2. The density of air at ordinary atmospheric pressure and 25°C is 1.19 g/L. What is the mass in kilograms of the air in a room that measures 10.5ft × 12.5ft × 7.0ft? (6pts)

(Notes:

12 in = 1 ft

2.54 cm = 1 in

1cm³ = 1mL)

$$V = 10.5ft \times 12.5ft \times 7.0ft = 918.75ft^3$$

$$918.75ft^3 \times \frac{(12in)^3}{(1ft)^3} \times \frac{(2.54cm)^3}{(1in)^3} \times \frac{1mL}{1cm^3} \times \frac{10^{-3}L}{1mL} \times \frac{1.19g}{L} \times \frac{1kg}{10^3g} =$$

$$31kg$$

3. The recommended single dose for acetaminophen (brand name: Tylenol) is 15.0 milligrams per kilogram of body weight for adults. Using this guideline, calculate the dosage in grams, for a single dose, for a person who weighs 159 pounds. (5pts)

(Notes:
2.21 lbs = 1kg)

$$159 \text{ lbs} \times \frac{1 \text{ kg}}{2.21 \text{ lbs}} \times \frac{15.0 \text{ mg}}{1 \text{ kg}} \times \frac{10^{-3} \text{ g}}{1 \text{ mg}} = 1.08 \text{ g}$$

4. Bromine has two isotopes. The abundance of bromine-79 (78.9183 amu) is equal to 50.69%. The second isotope is bromine-81. What is the atomic mass of bromine-81 (record 4 places past the decimal)? (5pts) $100\% - 50.69\% = 49.31\%$

Average Atomic Mass = (Fractional Abundance_A × mass_A) + (Fractional Abundance_B × mass_B)

$$79.904 = (0.5069 \times 78.9183) + (0.4931 \chi)$$

$$79.904 = 40.00368627 + 0.4931 \chi$$

$$- 40.00368627 \quad - 40.00368627$$

$$\frac{39.90031373}{0.4931} = \frac{0.4931 \chi}{0.4931}$$

$$\boxed{80.9173 = \chi}$$

5. Give the number of significant figures in each of the following. (3pts)

a) 10.0005 g 6

b) 0.003423 mm 4

c) 8.9×10^5 L 2

6. Determine the answer for each of the following. Be sure to use the correct number of significant figures. (6pts)

a) $27.34 + 6.90 - 13.124 = 21.12$

b) $0.32 \times 14.50 + 120 =$

$4.64 + 120 = 124.64 = 120$
nothing in ones place

c) $(24.1 / 0.005) \times (1.23 \times 10^4) =$

$4820 \times (1.23 \times 10^4) = 6 \times 10^7$

7. Convert each of the following into correct scientific notation with proper significant figures. (4pts)

1747 1.747×10^3

0.00000984 9.84×10^{-6}

0.002014×10^2 2.014×10^{-1}
 $= .2014$

2560000000000000000 2.56×10^{16}

8. What are the names of the following groups AND what is the charge of the ions that form in each group? (6pts)

Group 1 Alkali Metals +1

Group 2 Alkaline Earth +2
metals

Group 7 Halogens -1

9. Give one example for each of the following: (4pts)

a. A physical change in chemistry.

b. A chemical change in chemistry.

10. Determine the number of protons, neutrons, and electrons in the following: (6pts)

a. Chlorine-37 $p = 17$ $n = 20$ $e = 17$

b. Iron-54 $p = 26$ $n = 28$ $e = 26$

c. $^{18}\text{O}^{2-}$ $p = 8$ $n = 10$ $e = 10$

d. $^{27}\text{Al}^{3+}$ $p = 13$ $n = 14$ $e = 10$