

## Chem 1104-2018 Summer Problem Set #1

1. State the number of significant figures in the following number:

a) 3.00100, b) 15.011, c)  $2.998 \times 10^8$ , d) 0.0001, e) 0.0200, f) 300 , g)  $1.05 \times 10^{-23}$ , h) 1235, i) 0.035, j) 0.01002

2. Perform the following calculation and report the answer to the appropriate number of significant figures. **NOTE:** All calculations in parenthesis are done first, followed by multiplication and division, and then addition and subtraction.

A)  $(2.352 + 1.4 + 0.25) \div 2.0 \times 10^{-2} =$

B)  $0.08206 \times (273.15 + 1.2) =$

C)  $534.71 \times 321.83 \times 0.00186 =$

D)  $6.0 \times 10^{-2} + 3.0 \times 10^{-3} \times 2.50 =$

3. If the mass of a sample of plastic is 1.78 g and occupies a volume of 1.2 mL, calculate the density of the plastic and report the answer using the appropriate number of significant figures.

$$\text{Density} = \text{Mass} \div \text{Volume}$$

4. Convert the following temperatures as indicated:

a)  $98.6^\circ\text{F}$  to  $^\circ\text{C}$ , b)  $-40.0^\circ\text{C}$  to  $^\circ\text{F}$ , c) absolute zero, 0 K to  $^\circ\text{F}$ , d)  $-269^\circ\text{C}$  to K.

5. a) Given the following data

$$1.00 \text{ lb} = 453.6 \text{ g}$$

How many lbs are in 125 g?

b) If you run 7.5 laps around a 200. m track, how far have you run in metres and how many laps would it take to travel a distance of 1700 m.

6. Given the following data:

$$1 \text{ km} = 0.62137 \text{ mi}$$

$$1000 \text{ m} = 1 \text{ km}$$

$$100 \text{ cm} = 1 \text{ m}$$

How many centimetres(cm) are in 15 mi and express your answer using the appropriate number of significant figures and in scientific notation.

7. Given the following data:

$$0.001 \text{ g} = 1 \text{ mg}$$

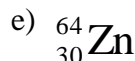
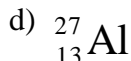
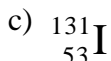
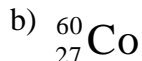
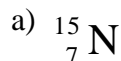
$$1 \times 10^{-12} \text{ g} = 1 \text{ pg}$$

$$1 \times 10^{-9} \text{ g} = 1 \text{ ng}$$

a) How many picograms(pg) are in 2 mg?

b) How many picograms(pg) are in 35 ng?

8. State the number of protons, neutrons, and electrons in the following atoms:



**Answer Set for Chem 1104-2018 Summer Problem Set #1**

1. a) 3.00100                    6  
   b) 15.011                    5  
   c)  $2.998 \times 10^8$             4  
   d) 0.0001                    1  
   e) 0.0200                    3  
   f) 300                         1, 2, or 3  
   g)  $1.05 \times 10^{-23}$ ,            3  
   h) 1235                       4  
   i) 0.035                      2  
   j) 0.01002                  4
  
2.     A)  $(2.352 + 1.4 + 0.25) \div 2.00 \times 10^{-2} = 2.0 \times 10^2$   
       B)  $0.08206 \times (273.15 + 1.2) = 22.52$   
       C)  $534.71 \times 321.83 \times 0.00186 = 320.$  or  $3.20 \times 10^2$   
       D)  $6.0 \times 10^{-2} + 3.0 \times 10^{-3} \times 2.50 = 0.068$
  
3. density = 1.5 g/mL
  
- 4.a)  $98.6^\circ\text{F} = 37.0^\circ\text{C}$   
   b)  $-40.0^\circ\text{C} = -40^\circ\text{F}$   
   c) absolute zero, 0 K =  $-459.67^\circ\text{F}$   
   d)  $-269^\circ\text{C} = 4$  K
  
5. a) 0.276 g; b) 1500 m, 8.5 laps
  
6. 15 mi =  $2.4 \times 10^6$  cm
  
- 7.a)  $2 \times 10^9$  pg; b)  $3.5 \times 10^4$  pg
  
8. a) 7 protons, 8 neutrons, 7 electrons  
   b) 27 protons, 33 neutrons, 27 electrons  
   c) 53 protons, 78 neutrons, 53 electrons  
   d) 13 protons, 14 neutrons, 13 electrons  
   e) 30 protons, 34 neutrons, 30 electrons