CHEMISTRY : DIMENSIONAL ANALYSIS PRACTICE IV

Significant Digits

A. Determine the number of significant figures in the following:

_____1) 10.350

_____2) 0.004070

B. Perform the following calculations and write the answer using correct significant digits:

_____3) 78.100 cm + 4.9 cm

_____4) 16.80 g ÷ 4.2 mL

C. Write the following in scientific notation:

_____5) 0.008230

_____6) 456 000

D. Perform the following calculations and write the answer in correct significant figures AND in correct scientific notation:

_____7) $(8.3 \times 10^{2})(5.7 \times 10^{-4})$

_____8) $(6.7 \times 10^{5}) - (9.2 \times 10^{4})$

E. For numbers 9-13 list the following measurements from largest to smallest:

a) 0.50 m b) 5000 mm c) 0.05 cm
d) 500 km e) 10 cm

_____9)

_____10)

_____11)

_____12)

_____13)

F. Use dimensional analysis to make the following conversions and use correct significant figures:

_____14) Convert 5.0×10^{4} mm to km

_____15) Convert 0.0074 kg to cg

_____16) Convert 831 mL to L

G. Use Dimensional analysis, the equation for density, and correct significant digits to solve the following density problems: D = M/V

_____17) Cough syrup has a density of 0.950 g/cm^3. What volume of cough syrup has a mass of 50.0 g?

_____18) A copper penny has a mass of 3.1 g and a volume of 0.35 cm^3. What is the density of copper?

_____19) What is the mass of an object that occupies a volume of 4.5 cm^3, and has a density of 19.3 g/cm^3?

_____/_____20) A student determines the mass of a metal rod to be 39.35 g. It is placed in 10.00 mL of water, and the water level rises to 15.00 mL. What is the density of the rod? Use the table of densities on pg. 72 of your text to tell what metal makes the rod.

H. Solve the following problems:

_____21. Convert 2 weeks to seconds

_____22. What are the correct units for the answer to a problem if the following series of conversion factors are used?

$$\frac{km}{m} \times \frac{in}{ft} \times \frac{mi}{h} \times \frac{ft}{mi} \times \frac{m}{cm} \times \frac{cm}{in} = ?$$

_____23. Evaluate the following:

$$\frac{[3.5\times10^{18}][1.47\times10^{6}][3.442\times10^{-3}][9.97\times10^{5}]}{[9\times10^{31}][6.634\times10^{8}][2.7\times10^{4}][6.02\times10^{23}]} = ?$$

_____24. Given the following equivalents, make the following conversion

1 fizzle = ? frizzles

4 swizzles = 5 twizzles
1 fizzle = 3 drizzles
3 twizzles = 18 sizzles
1 swizzle = 20 frizzles
10 drizzles = 4 sizzles

_____25. Jules Verne wrote a book called *Twenty Thousand Leagues Under the Sea.* Convert 20,000 leagues to fathoms. Some useful equivalents are listed below.

12 in = 1 ft,
3 ft = 1 yd,
1 fathom = 2 yards,
1 statute mile = 5280 ft
1 nautical mile = 6080 ft,
1 league = 3 nautical miles

I. Conversions

_____26. 75 cm to inches

_____27. 2300 g to pounds

_____28. 6.0 ft, 10 inches to cm

_____29. 8100 ml to quarts

_____30. 3.945×10^{8} seconds to years

_____31. 35 mi/hr to m/s

J. Rewrite the following numbers so that they are in proper powers of ten notation:

_____32. 652.9×10^{5}

_____33. 0.0259×10^{8}

_____34. 759.2×10^{-6}

_____35. 0.00598×10^{-15}

_____36. 9568.19×10^{3}

K. Solve the following problems:

_____37. Chemists have determined that 18.0 ml of water consists of 6.02×10^{23} molecules. Assuming that a teaspoon holds 3.70 ml of water, how many water molecules are in the teaspoon?

_____38. At 41¢ per liter, how much will it cost to fill a 15 gallon tank with gasoline?

_____39. 35 mL of ethyl alcohol (density = 0.789 g/mL) is added to a graduated cylinder that weighs 44.28 g. What will be the mass of the cylinder plus the alcohol?

_____40. Given the following equivalents, make the following conversion:

1 knop = ? knips

4 clips = 5 blips
1 knop = 6 bippy
3 blip = 18 pringle
1 clip = 10 knip
10 bippy = 8 pringle