DIMENSIONAL ANALYSIS (DA) PRACTICE 1 – Practice #5

Math directions:

Show all calculations and unit cancellations. Round all answers to the proper amount of sig.figs.

Remember that exact numbers like "60 sec = 1 min" and metric conversions (KHDUDCM) are an infinite number of sig.figs and do not limit the sig.figs in the final answer.

GENERAL CONCEPTS

1) Define or describe "conversion factor" in your own words.
2) List three common conversion factors that are not already shown on this sheet.
   Example: 7 days = 1 week

PARTICLE & MOLE CALCULATIONS

A mole (mol) is a unit used in science to count very small particles like atoms.

1 mole = 6.02 x 10^{23} particles and 6.02 x 10^{23} particles = 1 mole

3) How many atoms are contained in 0.789 moles of the imaginary element "Bauckium"?
4) How many mol are equivalent to 5.14 x 10^{22} atoms of Bauckium?
5) Calculate the number of atoms of Fe in 1.6 mol Fe.

LITER & MOLE CALCULATIONS

Under STP conditions (standard temperature and pressure), 1 mole of any gas will occupy 22.4 L of space. 1 mole = 22.4 L and 22.4 L = 1 mole

6) Calculate the amount of liters of CO_2 if there are 0.4011 mol of CO_2 in the container. Assume STP conditions.
7) Find the amount of moles of ammonia (NH_3) in 100.0 L of ammonia at STP.
8) How many L are found in 5.77 mol of Ne gas at STP?

GRAM & MOLE CALCULATIONS

The decimal number of an element on the periodic table (atomic mass) is equal to the number of grams in one mole of that element. Round that number to 0.01 g.

1 mole = (atomic mass) g and (atomic mass) g = 1 mole

9) Calculate the number of grams in 48.75 mol of sodium (Na).
10) How many moles of aluminum (Al) are found in 300.00 g Al?
11) How many g of xenon (Xe) are equivalent to 0.667 mol Xe?

MORE →

METRIC CALCULATIONS

12) Change 56.19 km/hr to m/s.
13) How many minutes are in one year? *365.25 days = 1 year*
14) A car can travel 30.0 mi on one gallon of gas. How many km/L is this?
    1.61 km = 1 mi. *1 L = 1.06 quarts* *1 gal = 4 quarts*
15) An airplane was flown at a speed of 12,193 mph (mi/hr). What was this speed in m/s? *1.61 km = 1 mi.*
16) Gold has sold for as much as $500.00 per oz. How many mg of gold could 1 cent buy? *1 oz. = 28.3 g*
17) Calculate the cost of gasoline for a road trip of exactly 450 miles if your car averages 20.0 miles/gal of gas, and the gas costs $2.75 per gallon.|
18) Convert a density of 35.5 g/mL to kg/cL.

SILLY PROBLEMS

Dimensional analysis even works with nonsense units. In this case, it is the procedure you are practicing. Use these EXACT conversion factors:
28 konks = 1 foop *12 foops = 1 zark* *1 zark =20 neek* *1 neek = 50 blips*

19) How many blips are in exactly one konk?
20) How many foops are in exactly 52 neeks?
21) Calculate the number of zarks contained in exactly 975 blips.
22) Find the number of konks in 1400.5 zarks.