HONORS CHEMISTRY UNIT 8 NOTES

MEASUREMENT AND CALCULATIONS

SCIENTIFIC NOTATION

What is it?

What is it used for?

Turning numbers greater than one into scientific notation

Turning numbers less than one into scientific notation

CHECK POINT

1. 12,500
2. 247
3. 0.0024
4. 0.0000072
5. 350,000,000

UNITS

English System

Metric System

International System of Units

Some fundamental SI Units

Mass

Length

Time

Temperature

Common prefixes

Kilo-

Deci-

Centi-

Milli-

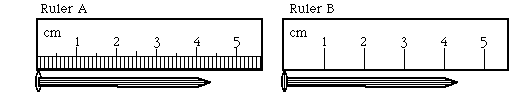
MEASUREMENTS OF LENGTH, VOLUME AND MASS

Length

Volume

Mass

UNCERTAINTY IN MEASUREMENT



SIGNIFICANT FIGURES (DIGITS)

RULES FOR COUNTING SIGNIFICANT FIGURES

1. Nonzero integers
2. Zeros
3. Leading zeros
4. Captive zeros
5. Trailing zeros
6. Exact numbers

Examples

1. 0.0108 g
2. 0.0050060 g
3. 5.030 x 103 ft
4. 110 riders started, but only 60 finished

CHECK POINT

1. 0.000304 g
2. 1.270 x 102 m
3. 0.9020 L
4. 480 cars were in the parade

Determining Significant Figures (Digits) in Calculations

1. Multiplication and Division

EXAMPLES

1. 12.6 x 0.53
2. 8.315 ÷ 298
3. 5.44 x 0.235
4. Addition and Subtraction

EXAMPLES

1. 12.11 + 18.0
2. 0.6875 – 0.1
3. 32,575 + 985.663

What if you have to do both?

EXAMPLES

a. (12.6 x 0.53) – 4.59

b. (25.36 – 4.15) ÷ 2.317

PROBLEM SOLVING AND DIMENSIONAL ANALYSIS

Converting from one unit to another

Conversion factor

Two important facts about conversions factors

1.

2.

Dimensional Analysis

Converting from One Unit to Another

Step 1

Step 2

Step 3

Step 4

Step 5

CONVERSION FACTORS: ONE STEP PROBLEMS

* 1. How many in. are there in 62 cm?
  2. How many meters are there in 55 cm?
  3. How many meters are there in 2.55 km?
  4. How many liters are there in 2.55 quarts?
  5. How many g are there 2500 dg?
  6. How many pounds in a 50 kg bag of flour?

CONVERSION FACTORS: MULTIPLE-STEP PROBLEMS

* 1. How many km are in 25,000 cm?
  2. How many inches in 4.25 miles?
  3. How many mm are there in 2.66 km?
  4. How many pints in 4.50 gallons of Kool-Aid?
  5. How many seconds in one day?

TEMPERATURE CONVERSIONS: AN APPROACH TO PROBLEM SOLVING

Fahrenheit

Celsius

Kelvin

Converting from Kelvin to Celsius and vice versa

EXAMPLES

1. 37oC to K
2. 298 K to oC

Converting from Celsius to Fahrenheit and vice versa

EXAMPLES

1. 28oC to oF
2. 101oF to oC

Now Try

1. 29oF to K
2. 350. K to oF

DENSITY

Density

EXAMPLES

1. What is the density of a rock with a mass of 25.2 g and a volume of 6.25 cm3?
2. Calculate the volume in mL occupied by a certain object having a density of 8.00 g/mL and a mass of 25.0 g.
3. Calculate the mass in grams of benzene having a density of 0.880 g/mL and a volume of 125 mL.

1. What is the density of an object with a mass of 15.6 g and a volume of 35.0 mL?
2. The density of Aluminum is 2.70 g/cm3. What is the mass of a piece of aluminum that occupies a volume of 60.0 cm3?
3. Calculate the volume in mL of 360. g of liquid whose density is 1.20 g/mL.