

Chem 11 (1) Unit 2 Notes

Note Title

2/6/2008

Wed Feb 6/08

Unit Conversions

$$\frac{2}{\cancel{7}} \times \cancel{7} = 2$$

$$\cancel{\text{have}} \times \frac{\text{want}}{\cancel{\text{have}}} = \text{want}$$

$$56 \times 1 = 56$$

Conversion Factor

$$\frac{1 \text{ mg}}{10^{-3} \text{ g}} = 1$$

mg
prefix base unit

$$0.007 \text{ mg} = ? \text{ g}$$

$$7 \times 10^{-3} \text{ mg} \times \frac{10^{-3} \text{ g}}{1 \text{ mg}} = \underline{7 \times 10^{-6} \text{ g}}$$

Whole numbers

$$3 = 3 \times 10^0$$

$$5 \text{ ng} = ? \text{ g}$$

$$5 \times 10^0 \text{ ng} \times \frac{10^{-9} \text{ g}}{1 \text{ ng}} = \underline{5 \times 10^{-9} \text{ g}}$$

$$500 \text{ MHz} = ? \text{ Hz}$$

$$5 \times 10^2 \text{ MHz} \times \frac{10^6 \text{ Hz}}{1 \text{ MHz}} = \underline{5 \times 10^8 \text{ Hz}}$$

$$6 \text{ s} = ? \text{ ps}$$

$$\begin{matrix} (0 - -12) \\ 0 + 12 = 12 \end{matrix}$$

$$\underline{6 \times 10^0 \text{ s}} \times \frac{1 \text{ ps}}{10^{-12} \text{ s}} = \underline{6 \times 10^{12} \text{ ps}}$$

p. 21 of Text (ans p. 251)

17. a-f (try "g")

Both Have Prefixes

prefix 1 \rightarrow base unit \rightarrow prefix 2

$$5 \text{ dL} = \text{mL}$$

$$5 \times 10^0 \text{ dL} \times \frac{10^{-1} \text{ L}}{1 \text{ dL}} = \underline{5 \times 10^{-1} \text{ L}}$$

$$5 \times 10^{-1} \text{ L} \times \frac{1 \text{ mL}}{10^{-6} \text{ L}} = \underline{5 \times 10^5 \text{ mL}}$$

$$6 \text{ pm} = ? \text{ km}$$

$$6 \times 10^0 \text{ pm} \times \frac{10^{-12} \text{ m}}{1 \text{ pm}} \times \frac{1 \text{ km}}{10^3 \text{ m}} = \underline{6 \times 10^{-15} \text{ km}}$$

17. a-j p. 21
show me - due Thurs Feb 7
8:45 A.M.

Thurs. Feb 7/08

Try:

$$0.00006 \text{ Gg} = ? \text{ cg}$$

$$6.0 \times 10^{-5} \text{ Gg} \times \frac{10^9 \text{ g}}{1 \text{ Gg}} \times \frac{1 \text{ cg}}{10^{-2} \text{ g}} = \underline{6.0 \times 10^6 \text{ cg}}$$

How many seconds in a year (366) d?

Plan: 1 a \rightarrow d \rightarrow h \rightarrow min \rightarrow s

$$1 \text{ a} \times \frac{366 \text{ d}}{1 \text{ a}} \times \frac{24 \text{ h}}{1 \text{ d}} \times \frac{60 \text{ min}}{1 \text{ h}} \times \frac{60 \text{ s}}{1 \text{ min}} = 31,622,400 \text{ s}$$

$$\underline{3.16224 \times 10^7 \text{ s}}$$

Changing the Bottom Unit

eg) $40 \frac{\text{Kg}}{\text{L}} = ? \frac{\text{Kg}}{\text{mL}}$

$$4.0 \times 10^1 \frac{\text{Kg}}{\text{L}} \times \frac{10^{-3} \text{ L}}{1 \text{ mL}} = \underline{4.0 \times 10^{-2} \frac{\text{Kg}}{\text{mL}}}$$

$$0.006 \frac{\text{g}}{\mu\text{L}} = ? \frac{\text{g}}{\text{L}}$$

$$6 \times 10^{-3} \frac{\text{g}}{\mu\text{L}} \times \frac{1 \mu\text{L}}{10^{-6} \text{ L}} = 6 \times 10^3 \frac{\text{g}}{\text{L}}$$

Combo's

Time units - don't need sc. notation

(1 by longer time)

eg) $\frac{1 \text{ min}}{60 \text{ s}} \quad \frac{1 \text{ h}}{60 \text{ min}}$

eg) $400 \frac{\text{g}}{\text{CL}} = ? \frac{\text{mg}}{\text{L}}$

$$4 \times 10^2 \frac{\text{g}}{\text{CL}} \times \frac{1 \text{ mg}}{10^{-3} \text{ g}} \times \frac{1 \text{ CL}}{10^{-2} \text{ L}} = \frac{4 \times 10^7 \text{ mg}}{\text{L}}$$

$0.008 \frac{\text{mg}}{\text{ML}} = ? \frac{\text{Kg}}{\text{L}}$

$$8 \times 10^{-3} \frac{\text{mg}}{\text{ML}} \times 10^{-3} \frac{\text{g}}{1 \text{ mg}} \times \frac{1 \text{ Kg}}{10^3 \text{ g}} \times \frac{1 \text{ mL}}{10^{-3} \text{ L}} = \frac{8 \times 10^{-6} \text{ Kg}}{\text{L}}$$

do 17 L → 0 p.21 ✓

Fri Feb 8/08

$\frac{0.003 \text{ ng}}{\text{s}} = ? \frac{\text{mg}}{\text{min}}$

$$\left(3 \times 10^{-3} \frac{\text{ng}}{\text{s}} \times 10^{-9} \frac{\text{g}}{1 \text{ ng}} \times \frac{1 \text{ mg}}{10^{-3} \text{ g}} \times \right) \frac{60 \text{ s}}{1 \text{ min}}$$

$$3 \times 10^{-9} \times 60 \frac{\text{mg}}{\text{min}}$$

$$180 \times 10^{-9} \text{ mg/min} = \underline{1.8 \times 10^{-7} \text{ mg/min}}$$

What is heavier, lead or styrofoam?
14.81g 0.06
~~95.55g~~
styrofoam

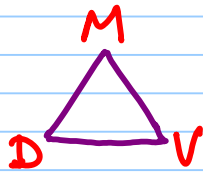
Density

Density - Mass per unit volume

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

some units for Density: $\frac{\text{kg}}{\text{L}}$ $\frac{\text{g}}{\text{mL}}$ $\frac{\text{mg}}{\text{L}}$

$$D = \frac{M}{V} \quad M = D \times V \quad V = \frac{M}{D}$$



mountain
Deep Valley

example questions

1. The mass of a 3.0 mL piece of Li is 1.6 g. Calculate the density.



$$D = \frac{M}{V} = \frac{1.6 \text{ g}}{3.0 \text{ mL}} = \underline{0.53 \text{ g/mL}}$$

2. The density of Beryllium is 1.85 g/mL . Calculate the mass of a 0.75 L chunk of Be.

$\frac{M}{DIV}$

$$M = D \times V$$

$$= 1.85 \frac{\text{g}}{\text{mL}} \times 750 \text{ mL} = \frac{1387.5 \text{ g}}{(1.39 \text{ Kg})}$$

3. The density of Al is 2.70 g/mL . Find the volume occupied by a 60.0 mg piece of Al.

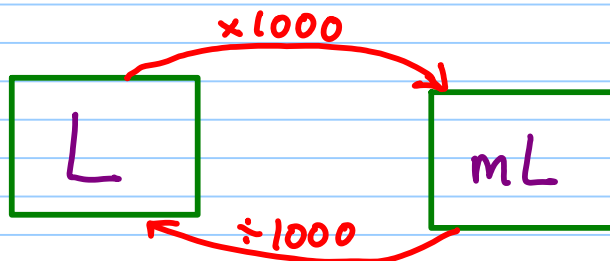
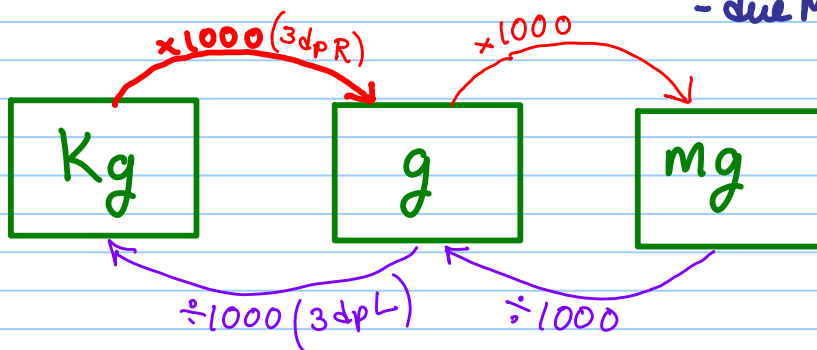
$\frac{M}{DIV}$

$$V = \frac{M}{D} = \frac{0.060 \text{ g}}{2.70 \frac{\text{g}}{\text{mL}}} = 0.0222 \text{ mL}$$

Quickie Conversions

Ex. 31-35 p.26 SW

Show me
- due Mon Feb 6



Tues Feb 12/08

Adding/Subtracting with Sc. Notation

$$\text{eg) } (3.562 \times 10^3) + (2.0984 \times 10^2)$$

$$(3.562 + 0.20984) \times 10^3$$

$$3.77184 \times 10^3$$

$$\underline{3.772 \times 10^3}$$

ex 57 esl p. 40 show me

- due Wed Feb 13
at 8:45

Wed Feb 13/08

Try these:

Calculate and round to the correct number of SD's or DP's.

$$1. \quad 0.3614 \times 10^{-7} + 1.523 \times 10^{-9}$$

$$0.3614 \times 10^{-7} + 0.01523 \times 10^{-7}$$

$$(0.3614 + 0.01523) \times 10^{-7} = 0.37663 \times 10^{-7}$$

$$\underline{0.3766 \times 10^{-7}} \text{ or } \underline{3.766 \times 10^{-8}}$$

$$2. \quad 0.00002010 \times (1.6500 \times 10^{-6})$$

$$3.3165 \times 10^{-11} \rightarrow \underline{3.317 \times 10^{-11}} \checkmark$$

Do # 58 esl p. 40

3. Round the following to 2 SD's

a) 9.26812 930000 or 9.3×10^5

b) 0.003624 0.0036 or 3.6×10^{-3}

c) 9.436×10^{-4} 9.4×10^{-4}

Combo Questions (bedmas)

eg) $(3.2645 + 9.312) (0.0234 + 10.3662)$

4dp 3dp

$12.5765 \times$

4dp 4dp

10.3896

Don't
round these!

$3dp = 5sd$

$4dp = 6sd$

$= 130.6648044$

$= 130.66$

$(9.32104 - 6.14)$

$2dp = 3sd$

3.18104

$= 0.0127$

$(14.3301 + 236.1163)$

4dp

4dp

250.4464

4dp = 7sd

or 1.27×10^{-2}

$(2.89 \times 2.0034) + (1.78139 \times 0.983)$

5.789826

+

1.75110637

$3sd = 2dp$

$3sd = 2dp$

$= 7.54093237$

$= 7.54$

due Thur Feb 14

Ex 58 esl & 59 esl p. 40

Hand-In # 2 Significant Digits
- due Fri Feb 15 / 08

A sheet of lined paper with a vertical red margin line on the left and horizontal blue lines for writing. The paper is otherwise blank.