Name: Key
Blk:_____ Date:

Chemistry 11
SIMPLE UNIT CONVERSIONS

In chemistry you must be able to PROBLEM SOLVE using the UNIT CONVERSION METHOD....do not cheat yourself by using any other method!!!

The **unit conversion method** has three primary components:

A. The initial amount (and it's UNIT)
B. The conversion factor (and it's UNITS)
C. The unknown amount (and it's UNIT)

And it is written in the form **C = A x B**

Ex.1 What is the cost of 2 doz Tim Hortons® donuts if they cost $5.35/doz?
FIRST YOU MUST IDENTIFY THE PRIMARY COMPONENTS
C = The cost in $

A = 2 doz donuts

B = $5.35/doz → 1 doz = $5.35 or $5.35 = 1 doz

NOW PUT IT ALL TOGETHER:

$$\$ = 2 \text{ doz} \times \frac{\$5.35}{1 \text{ doz}} = \boxed{\$10.70}$$

Ex. 2 If 0.200 mL of platinum has a mass of 4.12 grams, what is the mass of 5.00 mL of platinum?
FIRST YOU MUST IDENTIFY THE PRIMARY COMPONENTS
C = # grams

A = 5.00 mL

B = 4.12 g / 0.200 mL OR 0.200 mL / 4.12 g

NOW PUT IT ALL TOGETHER:

$$\#\,g = 5.00\,mL \times \frac{4.12\,g}{0.200\,mL} = \boxed{103\,g}$$

Seat work/ Homework : Exercises: 1 + 2

ANSWERS TO UNIT II : INTRODUCTION TO CHEMISTRY

1. (a) unknown amount = cost in dollars or # of dollars
initial amount = 100 g
conversion factor = \$50/g, or 1 g/\$50
$\$ = 100\,g \times \frac{\$50}{1\,g} = \$5000$

(b) unknown amount = # of disks
initial amount = \$36.00
conversion factor = \$6.00/10 disks, or 10 disks/\$6.00
$\#\text{disks} = \$36.00 \times \frac{10\text{ disks}}{\$6.00} = 60\text{ disks}$

(c) unknown amount = volume in millilitres or # of millilitres
initial amount = 20 g
conversion factor = 0.35 g/mL, or 1 mL/0.35 g
$\#\text{mL} = 20\,g \times \frac{1\,mL}{0.35\,g} = 60\,mL$

(d) unknown amount = # of kiwi fruit
initial amount = \$5
conversion factor = 3 kiwi fruit/\$1, or \$1/3 kiwi fruit
$\#\text{kiwi} = \$5 \times \frac{3\text{ kiwi}}{\$1} = 15\text{ kiwi}$

(e) unknown amount = # of bims
initial amount = 30 tuds
conversion factor = 4 bims/5 tuds, or 5 tuds/4 bims
$\#\text{bims} = 30\text{ tuds} \times \frac{4\text{ bims}}{5\text{ tuds}} = 24\text{ bims}$

(f) unknown amount = # of goats
initial amount = 10 cows
conversion factor = 2 cows/7 goats, or 7 goats/2 cows
$\#\text{goats} = 10\text{ cows} \times \frac{7\text{ goats}}{2\text{ cows}} = 35\text{ goats}$

(g) unknown amount = mass of oxygen or # of grams
initial amount = 5.5 moles
conversion factor = 32 g/mole, or 1 mole/32 g
$\#g = 5.5\text{ moles} \times \frac{32\,g}{1\,mol} = 180\,g$

(h) unknown amount = # of sulphur molecules
initial amount = 104 sulphur atoms
conversion factor = 8 sulphur atoms/1 sulphur molecule, or 1 sulphur molecule/8 sulphur atoms
$\#\text{m.c} = 104\text{ atoms} \times \frac{1\text{ m.c.}}{8\text{ atoms}} = 13\text{ m.c}$

(i) unknown amount = length of time or # of seconds
initial amount = 200 coulombs
conversion factor = 35 coulombs/s, or 1 s/35 coulombs
$\#\text{sec} = 200\text{ coul} \times \frac{1\,s}{35\text{ coul}} = 6\,sec$

(j) unknown amount = temperature increase or # of °C
initial amount = 100 kJ
conversion factor = 4.18 kJ/1°C, or 1°C/4.18 kJ
$\#°C = 100\,kJ \times \frac{1°C}{4.18\,kJ} = 20°C$

2. (a) # of atoms = $5.5\text{ mol} \times \frac{6.02 \times 10^{23}\text{ atoms}}{1\text{ mol}} =$ **3.3×10^{24} atoms**

(b) # of moles = $25.0\text{ L} \times \frac{1\text{ mol}}{22.4\text{ L}} =$ **1.12 mol**

(c) # of moles = $7.0\text{ g} \times \frac{1\text{ mol}}{28\text{ g}} =$ **0.25 mol**

(d) # of seconds = $200.0\text{ coulombs} \times \frac{1\text{ s}}{35\text{ coulombs}} =$ **5.7 s**

(e) # of atmospheres = $4 \times 10^{-8}\text{ kPa} \times \frac{1\text{ atm}}{101.3\text{ kPa}} =$ **4×10^{-10} atmospheres**

(f) # of kilograms = $3.20 \times 10^{4}\text{ troy ounce} \times \frac{0.0311\text{ kg}}{1\text{ troy ounce}} =$ **995 kg**

(g) # of milliseconds = $5.0 \times 10^{-4}\text{ s} \times \frac{1\text{ ms}}{10^{-3}\text{ s}} =$ **0.50 ms**

(h) # of moles = $15\,100\text{ kJ} \times \frac{1\text{ mol}}{5450\text{ kJ}} =$ **2.77 mol**

i) $\#\text{mL} = 0.05\text{ micron} \times \frac{10^{-3}\text{ mm}}{1\text{ micron}} = 5 \times 10^{-5}\text{ mm}$