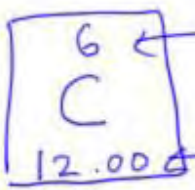
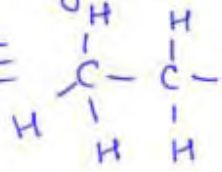
Nomenclature



protons

atomic weight $\left(\frac{g}{mol}\right) \equiv \frac{12.00\ g\ C}{mol}$

How many C atoms are in 5.25 mol of ethanol?

Ethanol ≡ 

Answer: $5.25\ \cancel{mol\ Ethanol}\left(\frac{6.02E23\ molecules}{\cancel{mol}}\right) = 3.16E24$ molecules ethanol

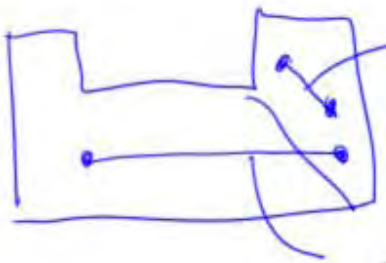
$\sqrt{\left(\frac{6.02E23\ molecules}{mol}\right)}$

$3.16E24\ \cancel{molecules\ Ethanol}\left(\frac{2\ C\ atoms}{1\ \cancel{molecule\ Ethanol}}\right) = \boxed{6.32E24\ atoms\ of\ C}$

$\left(\frac{2\ C\ atoms}{1\ molecule\ ethanol}\right)$

Nomenclature

Salts



Molecules → neutral (no charges)
ex) O_2 dioxygen

ex)
$Ba(OH)_2$ Barium hydroxide

OH hydroxide

$MgSO_4$ Magnesium Sulfate

SO_4^{-2} sulfate

$MgSO_4 \cdot 7H_2O$
Magnesium sulfate heptahydrate

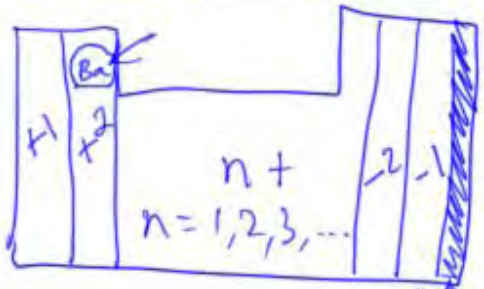
Species Keep charges

ex) $NaCl_{(s)} \rightleftharpoons Na^+ Cl^-$

Sodium chloride

[cation] [anion]

Periodic Table



Noble gases
Halides

$Zn(ClO_4)_2$ Zinc (II) perchlorate

Roman numeral only when using transition metals

ClO_4^- | perchlorate

$Co(OH)_3$ Cobalt (III) hydroxide

OH^-

Ammonium hypochlorite NH_4ClO

cation → NH_4^+

anion → ClO^-

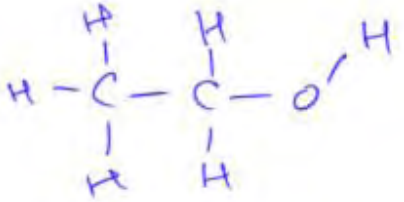
Lithium bicarbonate

Li^+ HCO_3^- | $LiHCO_3$

CO_3^{2-} carbonate // HCO_3^- bicarbonate

Molar Mass $\left(\frac{g}{mol}\right)$

C
12.00

ex] 

ethanol

Calculate Molar mass.

(molecular weight) / MW

$2 \times C = 2 \times (\text{atomic weight of element}) = 2(12.0\,g/mol)$

$6 \times H = 6 \times (1.01\ g/mol) +$

$1 \times O = 1 \times (16.00\ g/mol)$

$46.06\ \frac{g}{mol}$

$MW = 46.06\ \frac{g\ \text{ethanol}}{mol}$

Ethanol 46.06 g/mol

Say that one bottle of wine is said to contain 12% ethanol. How many molecules of ethanol does 750 mL bottle of wine contain?

total mL → EtOH mL → g → moles → # of molecules

0.12 (750 mL) = 90 mL Ethanol

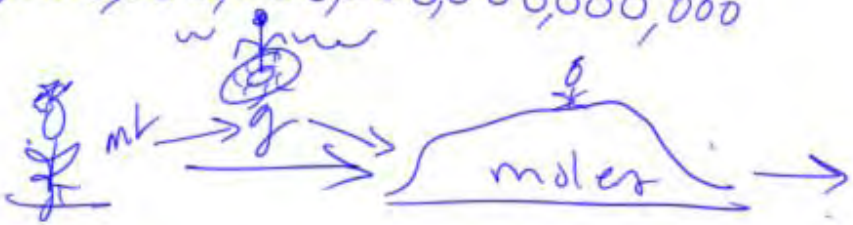
$$90\ \text{mL EtOH}\left(\frac{0.726\ \text{g EtOH}}{\text{mL}}\right)\left(\frac{\text{mol EtOH}}{46.06\ \text{g}}\right)\left(\frac{6.02\text{E}23\ \text{molec. EtOH}}{1\ \text{mol EtOH}}\right) =$$

density of wine $\left(0.920\ \frac{\text{g}}{\text{mL}}\right)$

density of ethanol $\left(0.726\ \frac{\text{g}}{\text{mL}}\right)$

8.54 E23 molecules EtOH

8,540,000,000,000,000,000,000,000



CO_2 (g)
carbon dioxide

If the car is producing 25 kg CO_2 per minute, how many molecules of CO_2 will release in 1 h?

kg/min → kg/h → g → mols → # molecules

$$1\,h\left(\frac{60\,min}{1\,h}\right)\left(\frac{25\,kg\,CO_2}{1\,min}\right)\left(\frac{1000\,g}{1\,kg}\right)\left(\frac{mol}{44.0\,g}\right)\left(\frac{6.02E23\ molec}{mol}\right)$$

$$= 2.05E28 \text{ molecules } CO_2$$

$$\left(\frac{1000\,g}{1\,kg}\right)\left(\frac{25\,kg}{1\,min}\right)\left(\frac{60\,min}{h}\right)$$

MW CO_2

$$\left(\frac{6.02E23\ E23\ molec}{mol}\right)$$

MW CO_2 = 1 x C = 1 (12.0) = 12.0 + 2 x O 2 (16.0) = 32.0
44.0 g/mol CO_2

g → mols →

Chp 2 : 2.57

PO_3^{2-} phosphite

(a) KH_2PO_4 Potassium dihydrogenphosphate

potassium

$H_2PO_4^-$ dihydrogen phosphate

(b) K_2HPO_4 Potassium hydrogenphosphate

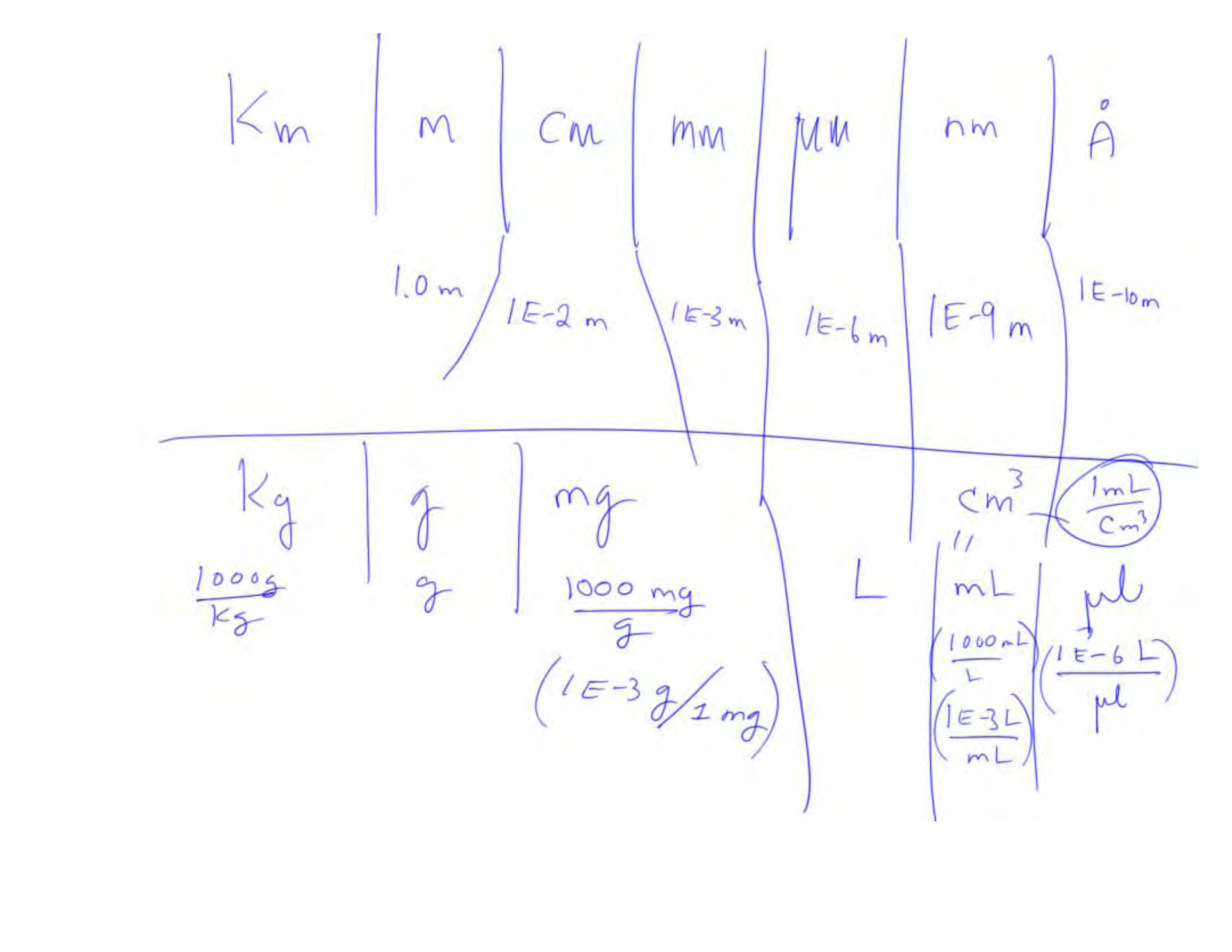
hydrogen phosphate HPO_4^{2-}

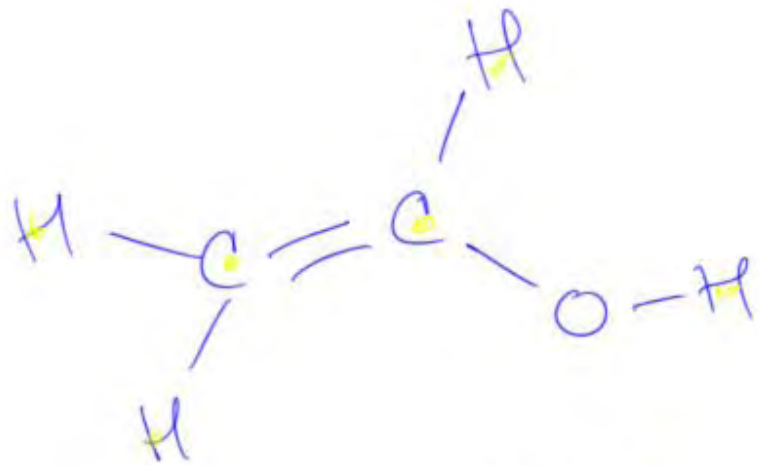
(g) NH_4NO_2

NH_4^+ ammonium

NO_2^- nitrite

ammonium nitrite


Km
m
Cm
mm
μm
nm
Å
1.0 m
1E-2 m
1E-3 m
1E-6 m
1E-9 m
1E-10 m
Kg
g
mg
cm³
1mL / Cm³
1000g / Kg
g
1000 mg / g
(1E-3 g / 1 mg)
L
mL
(1000mL / L)
(1E-3L / mL)
μl
(1E-6 L / μl)



C_2H_4O

Molar Mass

$= \left(44.0 \frac{g}{mol}\right)$

$2 \times C = 2(12.0) = 24.0$

$4 \times H = 4(1.0) = 4.0$

$1 \times O = 1(16.0) = 16.0$

$44.0\ g/mol$