

① nombre de pastilles
si 4 pastille = 1 mol
m

V_S

Pour comparer des
choix comparables
nombre de pastilles
dans 200 mL

dans 1 L
de la concentration m
 $C = \frac{m}{V_S}$

| | | | |
|----------------------------------|-----------------------------------------------------------------------------------------------|----------------------|-----------------------------------------|
| 6 mol | 200 mL = 0,2 L | 6 pastilles / 200 mL | $C = \frac{6}{0,2} = 30 \text{ mol/L}$ |
| 5 mol | 200 mL = 0,2 L | 5 " | $C = \frac{5}{0,2} = 25 \text{ mol/L}$ |
| 4 mol * $\downarrow \times 2$ | $\times 2 \left\{ \begin{array}{l} 100 \text{ mL} = 0,1 \text{ L} \\ 200 \end{array} \right.$ | * 8 " | $C = \frac{4}{0,1} = 40 \text{ mol/L}$ |
| 3 mol * $\downarrow \times 4$ | $\times 4 \left\{ \begin{array}{l} 50 \text{ mL} = 0,05 \text{ L} \\ 200 \end{array} \right.$ | ** 12 " | $C = \frac{3}{0,05} = 60 \text{ mol/L}$ |

②

$$V_S = \frac{m}{C}$$

$$m = C \cdot V_S$$

$$C = \frac{m}{V_S}$$

$$0,5 \text{ L}$$

$$0,2 \text{ mol}$$

$$C = \frac{m}{V_S} = \frac{0,2}{0,5} = 0,4 \text{ mol/L}$$

$$0,05 \text{ L}$$

$$m = C \cdot V_S = 0,4 \cdot 0,05 = 0,02 \text{ mol}$$

$$0,10 \text{ mol/L}$$

$$V_S = \frac{m}{C} = \frac{0,35}{1} = 0,35 \text{ L}$$

$$0,35 \text{ mol}$$

$$1 \text{ mol/L}$$

$$2,5 \text{ L}$$

$$m = C \cdot V_S = 0,04 \cdot 2,5 = 0,1 \text{ mol}$$

$$0,04 \text{ mol/L}$$

$$0,15 \text{ L}$$

$$0,2 \text{ mol}$$

$$C = \frac{m}{V_S} = \frac{0,2}{0,15} = 1,33 \text{ mol/L}$$

$$V_S = \frac{m}{C} = \frac{0,1}{2} = 0,05 \text{ L}$$

$$0,1 \text{ mol}$$

$$2 \text{ mol/L}$$

③ ? C

a) $y = 5 \text{ g/L}$

$$M_{\text{NaCl}} = 23 + 35,5 = 58,5 \text{ g/mol}$$

$$C = \frac{\gamma}{M} = \frac{5}{58,5} = 0,085 \text{ mol/L}$$

c) $y = 25 \text{ g/L}$

$$M_{\text{HCl}} = 1 + 35,5 = 36,5 \text{ g/mol}$$

$$C = \frac{\gamma}{M} = \frac{25}{36,5} = 0,685 \text{ mol/L}$$

b) $y = 80 \text{ g/L}$

$$M_{\text{Ca(OH)}_2} = 40 + 2 \cdot 16 + 2 \cdot 1 = 74 \text{ g/mol}$$

$$C = \frac{\gamma}{M} = \frac{80}{74} = 1,081 \text{ mol/L}$$

4) ? y

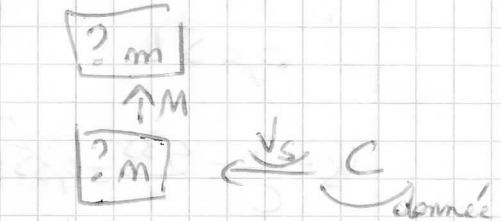
a) KOH $C = 1 \text{ mol/L}$
 $M_{\text{KOH}} = 39 + 16 + 1 = 56 \text{ g/mol}$
 $y = C \cdot M = 1 \cdot 56 = 56 \text{ g/L}$

b) HNO₃ $C = 0,25 \text{ mol/L}$
 $M_{\text{HNO}_3} = 1 + 14 + 3 \cdot 16 = 63 \text{ g/mol}$
 $y = C \cdot M = 0,25 \cdot 63 = 15,75 \text{ g/L}$

c) Na⁺ $C = 140 \text{ mmol/L} = 0,14 \text{ mol/L}$
 $M_{\text{Na}^+} = 23 \text{ g/mol}$
 $M_{\text{ion}} = M_{\text{atome}}$
 car M_e - négligeable
 $y = C \cdot M = 3,22 \text{ g/L}$

5) quantité de matière (en mols) e) masse
 ? m ? m

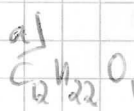
a) H₂SO₄ $C = 0,3 \text{ mol/L}$
 $V_s = 1 \text{ L}$
 $n = C \cdot V_s = 0,3 \cdot 1 = 0,3 \text{ mol}$
 $M_{\text{H}_2\text{SO}_4} = 2 \cdot 1 + 32 + 4 \cdot 16 = 98 \text{ g/mol}$
 $m = n \cdot M = 0,3 \cdot 98 = 29,4 \text{ g}$



b) NaOH $C = 2 \text{ mol/L}$
 $V_s = 400 \text{ mL} = 0,4 \text{ L}$
 $n = C \cdot V_s = 2 \cdot 0,4 = 0,8 \text{ mol}$
 $M_{\text{NaOH}} = 23 + 16 + 1 = 40 \text{ g/mol}$
 $m = n \cdot M = 0,8 \cdot 40 = 32 \text{ g}$

c) CaCl₂ $C = 2 \cdot 10^{-3} \text{ mol/L} = 0,002 \text{ mol/L}$
 $V_s = 700 \text{ mL} = 0,7 \text{ L}$
 $n = C \cdot V_s = 0,002 \cdot 0,7 = 0,0014 \text{ mol}$
 $M_{\text{CaCl}_2} = 40 + 2 \cdot 35,5 = 111 \text{ g/mol}$
 $m = n \cdot M = 0,1554 \text{ g}$

6) ? C



$m = 10g$
 $M_{C_{12}H_{22}O_{11}} = 12 \cdot 12 + 22 \cdot 1 + 11 \cdot 16 = 342 g/mol$

$n = \frac{m}{M} = \frac{10}{342} = 0,029 mol$

$V_s = 100 mL = 0,1 L$

$C = \frac{n}{V_s} = \frac{0,029}{0,1} = 0,29 mol/L$

diviser par M puis par V_s
 ou diviser par V_s puis par M

m réponse

$\frac{m}{M} \cdot \frac{1}{V_s}$
 $\frac{m}{M} \cdot \frac{1}{V_s}$

2 chemins possibles!

m exercice avec autre chemin

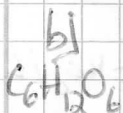
a) $m = 10g$

$V_s = 100 mL = 0,1 L$

$\gamma = \frac{m}{V_s} = \frac{10}{0,1} = 100 g/L$

$M = 342 g/mol$

$C = \frac{\gamma}{M} = \frac{100}{342} = 0,29 mol/L$

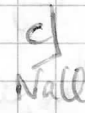


$m = 5g$
 $M_{C_6H_{12}O_6} = 6 \cdot 12 + 12 \cdot 1 + 6 \cdot 16 = 180 g/mol$

$n = \frac{m}{M} = \frac{5}{180} = 0,028 mol$

$V_s = 50 mL = 0,05 L$

$C = \frac{n}{V_s} = \frac{0,028}{0,05} = 0,56 mol/L$



$m = 2,013g = 2000g$
 $M_{NaCl} = 23 + 35,5 = 58,5 g/mol$

$n = \frac{m}{M} = \frac{2000}{58,5} = 34,3 mol$

$V_s = 15 L$

$C = \frac{n}{V_s} = \frac{34,3}{15} = 2,3 mol/L$

7) Info de l'étiquette en mg/L

est une concentration massique

$\gamma_{Ce^-} = 62 mg/L = 0,062 g/L$

$M_{Ce^-} = 355 g/mol$
 écart négligeable

$C_{Ce^-} = \frac{\gamma}{M} = \frac{0,062}{355} = 0,00175 mol/L$

$\gamma_{Mg^{++}} = 70 mg/L = 0,07 g/L$

$M_{Mg^{++}} = 24 g/mol$

$C_{Mg^{++}} = \frac{\gamma}{M} = \frac{0,07}{24} = 0,0029 mol/L$

8) a) y m $\xrightarrow{V_s}$ P_j

$$m = 40g$$

$$V_s = 250mL = 0,25L$$

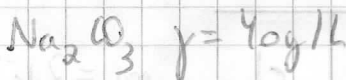
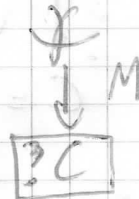
$$y = \frac{m}{V_s} = \frac{40}{0,25} = 160g/L$$

b) C



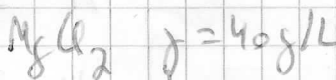
$$M_{Ca(NO_3)_2} = 40 + 2 \cdot 14 + 6 \cdot 16 = 164g/mol$$

$$C = \frac{y}{M} = \frac{40}{164} = 0,244 mol/L$$



$$M_{Na_2CO_3} = 2 \cdot 23 + 12 + 3 \cdot 16 = 106g/mol$$

$$C = \frac{y}{M} = \frac{40}{106} = 0,378 mol/L$$



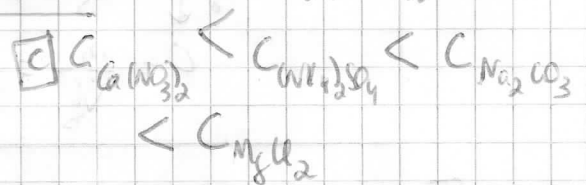
$$M_{MgCl_2} = 24 + 2 \cdot 35,5 = 95g/mol$$

$$C = \frac{y}{M} = \frac{40}{95} = 0,421 mol/L$$



$$M_{(NH_4)_2SO_4} = 2 \cdot 14 + 8 \cdot 1 + 32 + 4 \cdot 16 = 132g/mol$$

$$C = \frac{y}{M} = \frac{40}{132} = 0,303 mol/L$$

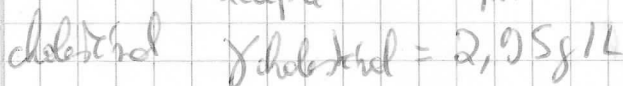


g) Infos en g/L : des y valeurs de références en mol/L des C

urée $y_{urée} = 0,3g/L$

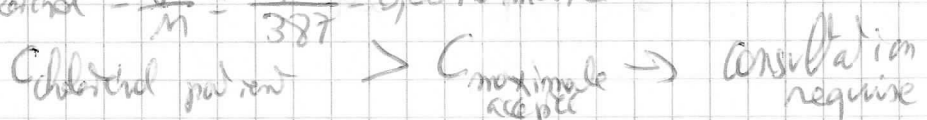
$$M_{urée} = 60g/mol$$

$$C_{urée} = \frac{y}{M} = \frac{0,3}{60} = 0,005 mol/L$$



$$M_{cholestérol} = 387g/mol$$

$$C_{cholestérol} = \frac{y}{M} = \frac{2,95}{387} = 0,0076 mol/L$$



Transformer l'un en l'autre pour pouvoir les comparer. Ici les y en C valable aussi les C en y .

10) a) ? C

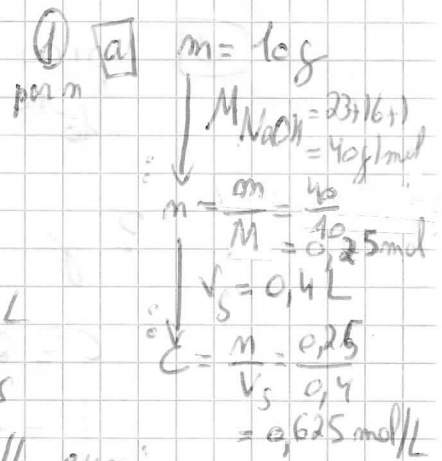
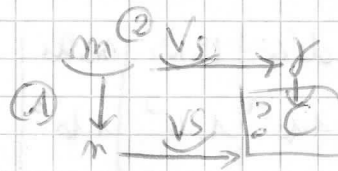
2 chemins possibles par n ou par y

Les 400 mL de la solution

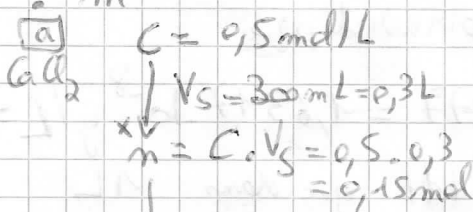
ont une concentration de 0,625 mol/L

si j'en preleve 100 mL elle aura toujours

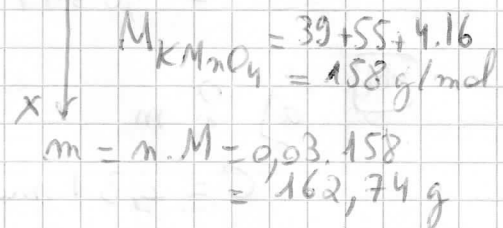
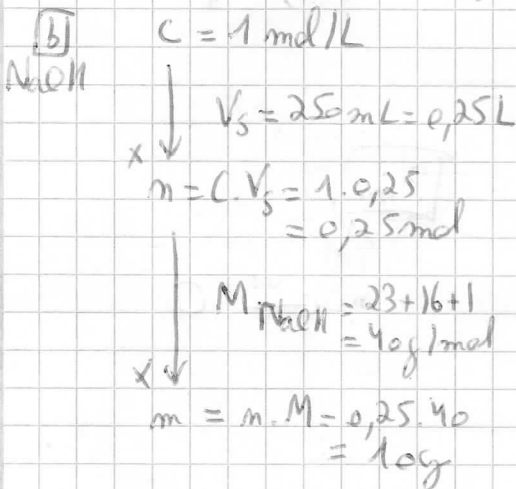
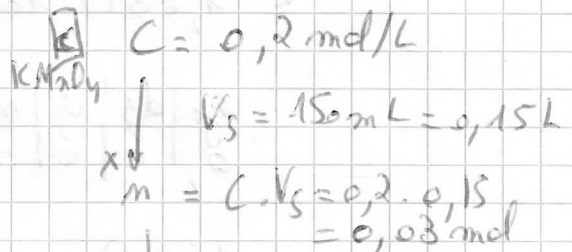
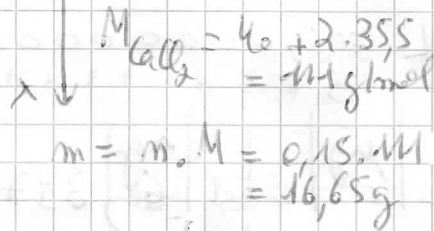
la m[^]me concentration [b] C = 0,625 mol/L aussi



11) ? m



autre chemin possible aussi par y



12) ? C d'après données = C fournie par fabricant ?

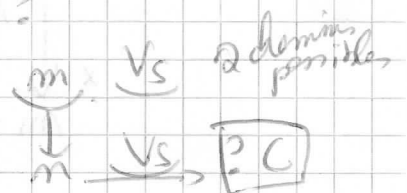
m = 72g

M_{CH₃COOH} = M_{C₂H₄O₂} = 2*12+4*1+2*16 = 60 g/mol

n = m / M = 72 / 60 = 1,2 mol

V_s = 1 L

C = n / V_s = 1,2 / 1 = 1,2 mol/L



très proche de la concentration donnée donc

infos correctes

13

| | | | | | | | |
|-----------|-----------|-----------|--|-----------|-----------|--|------------|
| déca | centi | milli | | micro | nano | | pico |
| 10^{-1} | 10^{-2} | 10^{-3} | | 10^{-6} | 10^{-9} | | 10^{-12} |

? y

δ
 \uparrow M
C

$$C = 21 \text{ pmol/L}$$

$$= 21 \cdot 10^{-12} \text{ mol/L}$$

$$= 2,1 \cdot 10^{-11} \text{ mol/L}$$

$$M_{\text{Hypoxine}} = 777 \text{ g/mol voir activité p 43}$$

$$y = C \cdot M = 2,1 \cdot 10^{-11} \cdot 777 = 1,6317 \cdot 10^{-8} \text{ g/L} =$$

le x moins dans 1 dL que dans 1 L

$$= 1,6317 \cdot 10^{-9} \text{ g/dL} = 0,0000000016317 \text{ g/dL}$$

| | | | | | | | | |
|---|----|----|----|---|---|----|---|--------|
| g | dg | cg | mg | | | mg | | mg |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,6317 |

3 2 1
 déplacement de 9 places

$$= 1,6317 \text{ ng/dL}$$

14

a) ? m

? m
 \uparrow M
 $m \leftarrow V_s \cdot C$

$$C = 0,31 \text{ mol/L}$$

$$V_s = 250 \text{ mL} = 0,25 \text{ L}$$

$$m = C \cdot V_s = 0,31 \cdot 0,25 = 0,0775 \text{ mol}$$

$$M_{\text{C}_{12}\text{H}_{22}\text{O}_{11}} = 12 \cdot 12 + 22 + 11 \cdot 16 = 342 \text{ g/mol}$$

$$m = m \cdot M = 0,0775 \cdot 342 = 26,5 \text{ g}$$