Devoir n°3

- La solution :

- Mélange binaire " deux constitué " benzène - Tol
- équimolaire : même nbr de mole

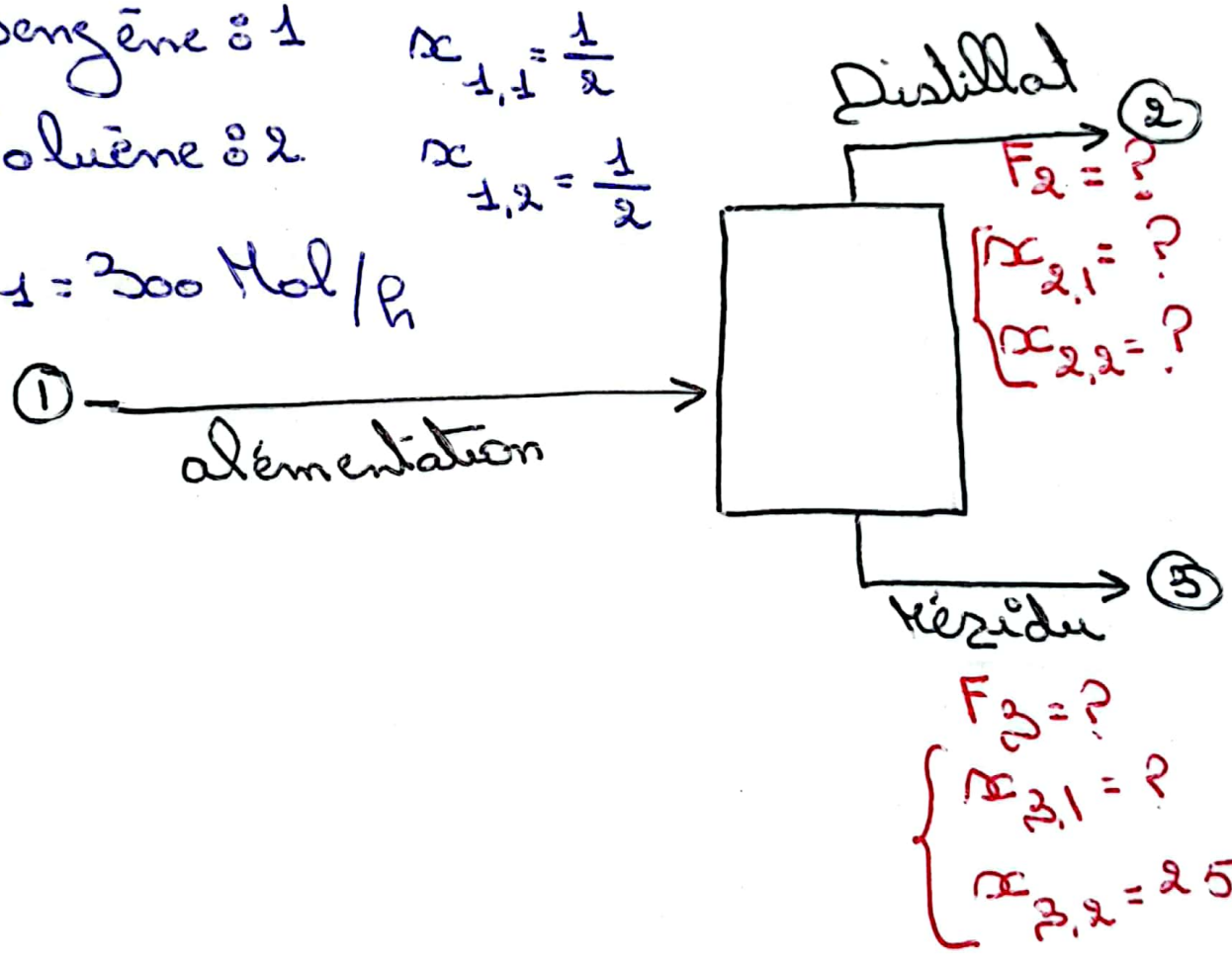
$$F_{1,1} = F_{1,2} \qquad x_{1,1} = x_{1,1} = \frac{1}{2}.$$

$$\sum x_{1,i} = 1$$

Benzène : 1 $x_{1,1} = \frac{1}{2}$

Toluène : 2 $x_{1,2} = \frac{1}{2}$

$F_1 = 300$ Mol/h



Donne : Distillat contien 40% de ~~Toluène~~ Benzène (1)

Donc : résidu contien 60% de Toluene (2)

Donc $F_{2,1} = 0,4\, F_{1,2}$ et $F_{3,1} = 0,6\, F_{1,2}$

$F_{2,1} = 0,4\, x_{1,2} \cdot F_1$ | $F_{3,1} = 0,6\, x_{1,1} F_1$

$F_2 = \sum F_{2,i}$ | $F_3 = \sum F_{3,i}$

$F_2 = F_{2,1} + F_{2,2}$ | $F_3 = F_{3,1} + F_{3,2}$

$F_2 = x_{2,1} F_2 + x_{2,2} \cdot F_2$ | $F_3 = x_{3,1} F_3 + x_{3,2} \cdot F_3$

-Donné: $x_{3,2} = 25\%$

$\sum x_{3,i} = x_{3,1} + x_{3,2} = 1 \rightarrow x_{3,1} = 1 - x_{3,2}$

$x_{3,1} = 1 - 0,25 = 0,75$

$\boxed{x_{3,1} = 75\%}$

Question : 1- Schéma de système

2- Calculer flux molaire et fraction molaire

Bilan Global : $\sum E = \sum S$

$F_1 = F_2 + F_3$ ---- (I)

BP/1 $F_{1,1} = F_{2,1} + F_{3,1}$ --- (1)

$x_{1,1} \cdot F_1 = x_{2,1} F_2 + x_{3,1} F_3$ --- (1')

BP/2 $F_{1,2} = F_{2,2} + F_{3,2}$ ---- (2)

$x_{1,2} F_1 = x_{2,2} F_2 + x_{3,2} F_3$ ---- (2')

- Calculer $F_{2,1}$: $F_{2,1} = 0,4 F_{1,1}$

$F_{2,1} = 94\, x_{1,1} F_1 = 0,4 \times \frac{1}{2} . 300$

$= 60$ Mol/h

- Calculer $F_{3,1}$: $F_{3,1} = 0,6 F_{1,1}$

$F_{3,1} = 0,6\, x_{1,1} F_1$

$F_{3,1} = 0,6 \frac{1}{2} . 300 = 90$ Mol/h

ou bien autre méthode : à partir équation (1)

$F_{1,1} = F_{2,1} + F_{3,1} \longrightarrow F_{3,1} = F_{1,1} - F_{2,1}$

$F_{3,1} = x_{1,1} . F_1 - F_{2,1} = \frac{1}{2} . 300 - 60 = 90 \frac{Mol}{h}$.

- On calculer la fraction $x_{3,1}$

$x_{3,1} = 1 - x_{3,2} = 1 - 0,25 = 0,75$

Donc $x_{3,1} = 75\%$

- Calculer le flux molair F_2 $F_{3,1} = x_{2,1} . F_3$

$F_3 = \frac{F_{3,1}}{x_{3,1}} = \frac{90}{0,75} = 120 \frac{Mol}{h}$.

a partir l'equation I: "bilan Global"

$$F_2 = F_1 - F_3 = 300 - 120 = 180 \frac{Kcal}{h}$$

Calculer $x_{2,1}$: $F_{2,1} = x_{2,1} \cdot F_2$.

$$x_{2,1} = \frac{F_{2,1}}{F_2} = \frac{60}{180} = \frac{1}{3}.$$

Calculer $x_{2,2}$: $\sum x_{2,i} = 1$

$$x_{2,1} + x_{2,2} = 1 \Rightarrow x_{2,2} = 1 - \frac{1}{3} = \frac{2}{3}.$$

- Schéma (2 pts)
- Calculer Flux malaxeur $F_{2,1}$ (1pt)

$F_{3,1}$ (1pt)

Bilan Global (1pt)
B.P/1 (1pt)
B.P/2 (1pt)

F_3 (1pt)

F_2 (0,5pt)

$x_{3,1}$ (0,5pt)

"$x_{2,1}$; $x_{2,2}$" (1pt)

10/10 points