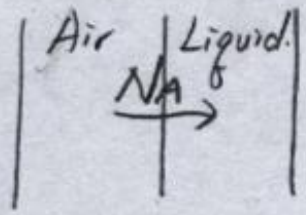
>9. 10.



$y_1 = 0.035$ $P = 2\ atm$, $T = 300k$, $0.6\frac{1}{K_y} = \frac{1}{k_y}$

$x_A = 0.01$, $y_A = 0.3 x_A$

$k_y = 1.25\ mol/m^2 \cdot s$ Find $x_{A,i}$ y_{Ai} K_y. K_x.

(Sol) $$\frac{1}{K_y} = \frac{1}{k_y} + \frac{m}{k_x}, \qquad 0.6\frac{1}{K_y} = \frac{1}{k_y} \quad -①$$

$$\Rightarrow 0.4\frac{1}{K_y} = \frac{0.3}{k_x} \quad -②$$

from ①

$K_y = 0.6\, k_y = 0.6 \cdot 1.25\ mol/m^2 \cdot s = 0.75\ mol/m^2 \cdot s$ (b) *

from ②

$0.4 k_x = 0.3 K_y \Rightarrow k_x = 0.75 K_y = 0.56\ mol/m^2 \cdot s$

$$\frac{1}{K_x} = \frac{1}{mk_y} + \frac{1}{k_x} = \frac{1}{0.3 \times 1.25} + \frac{1}{0.56} = 2.67 + 1.79$$

(C)

$\Rightarrow K_x = 0.22\ mol/m^2 \cdot s$ *

(2)

$$N_A = K_y(y_A - y_A^*) = k_y(y_A - y_{Ai}) = k_x(x_{Ai} - x_A)$$

$$= 0.75\left(\frac{mol}{m^2 \cdot s}\right)(0.035 - 0.01 \cdot 0.3) = 0.024 \frac{mol}{m^2 \cdot s}$$

(a)

$$= 1.25\left(\frac{mol}{m^2 \cdot s}\right)(0.035 - y_{Ai}) \Rightarrow y_{Ai} = 0.016$$

$$= 0.56\left(\frac{mol}{m^2 \cdot s}\right)(x_{Ai} - 0.01) \Rightarrow x_{Ai} = 0.053$$