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Kelas : 5B

- ① a) Diperoleh dengan mensubstitusikan persamaan 3-8 dan 3-9 kedalam persamaan 3-7

$$\text{pers 3-8} = [B^-] = K_a \frac{[HB]}{[H^+]}$$

$$\text{pers 3-9} = [HB] \cdot [HB] = K_a [HB]^2$$

$$\text{pers 3-7} = D = \frac{[HB]_{org} + 2[HB] \cdot [HB]_{org}}{[HB]_{aq} + [B^-]_{aq}}$$

Diperoleh pers 3-10

$$D = \frac{[HB]_{org} + 2K_d [HB]^2_{org}}{[HB]_{aq} + K_a [HB]_{aq} : [H^+]_{aq}}$$

$$= \frac{[HB]_{org} (1 + 2K_d [HB])}{[HB]_{aq} (1 + K_a : [H^+])}$$

$$= \frac{K_D (1 + 2K_d [HB])}{1 + K_a / [H^+]}$$

b) pH air

② $D = \frac{K_D}{1 + K_a / [H^+]}$

$$pH_4 = \rightarrow D = \frac{100}{1 + \frac{6,5 \times 10^{-5}}{10^{-4}}} = 60,6$$

$$pH_6 = \rightarrow D = \frac{100}{1 + \frac{6,5 \times 10^{-5}}{10^{-6}}} = 1,5$$

- ③ Saat koefisien distribusi sangat besar (>1000) jika koefisien distribusi tinggi akan memudahkan untuk memisahkan dengan pelarut yang sesuai

$$(4) a) K_D = \frac{C_{et}}{C_{aq}} = 3,0 = \frac{(4-x)/V}{x/0,5}$$

Ekstraksi 1

$$K_D = 3,0 = \frac{(4-x_1)/0,1}{x_1/0,5}$$

$$\frac{3x_1}{0,5} = \frac{4-x_1}{0,1}$$

$$0,3x_1 = 2 - 0,5x_1$$

$$0,8x_1 = 2$$

$$x_1 = 2,5$$

Jadi 2,5 g dilarutkan air dan 1,5 g dilarutkan eter

Ekstraksi 2

$$K_D = 3,0 = \frac{(2,5-x_2)/0,1}{x_2/0,5}$$

$$\frac{3x_2}{0,5} = \frac{2,5-x_2}{0,1}$$

$$0,3x_2 = 1,25 - 0,5x_2$$

$$0,8x_2 = 1,25$$

$$x_2 = 1,56 \text{ g}$$

Jadi 1,56 g dilarutkan air dan 0,94 g dilarutkan eter

Ekstraksi 3

$$K_D = 3,0 = \frac{(1,56-x_3)/0,1}{x_3/0,5}$$

$$\frac{3x_3}{0,5} = \frac{1,56-x_3}{0,1}$$

$$0,3x_3 = 0,78 - 0,5x_3$$

$$0,8x_3 = 0,78$$

$$x_3 = 0,975 \text{ g}$$

Ekstraksi 4

$$K_D = 3,0 = \frac{(0,975-x_4)/0,1}{x_4/0,5}$$

$$\frac{3x_4}{0,5} = \frac{0,975-x_4}{0,1}$$

$$0,3x_4 = 0,4875 - 0,5x_4$$

$$0,8x_4 = 0,4875$$

$x_y = 0,6 \text{ gr}$
jadi, $0,6 \text{ gr}$ dilapiskan air dan $0,375 \text{ gr}$ dilapiskan eter

Ekstraksi 5

$$K_D = 3,0 = \frac{(0,6 - x_5) / 0,1}{x_5 / 0,5}$$

$$\frac{3x_5}{0,5} = \frac{0,6 - x_5}{0,1}$$

$$0,3x_5 = 0,6 - 0,5x_5$$

$$0,8x_5 = 0,6$$

$$x_5 = 0,75 \text{ g}$$

Jadi, $0,75 \text{ g}$ dilapiskan air dan $0,225 \text{ gr}$ dilapiskan eter
sehingga $M_{\text{total}} = (1,5 + 0,94 + 0,585 + 0,375 + 0,221) \text{ g}$
 $= 3,625 \text{ g}$

Jadi, massa asam butirat yang ter ekstraksi dalam pelarut eter
sebanyak $3,625 \text{ g}$

- ⑥ dapat disimpulkan semakin banyak proses ekstraksi yang dilakukan, maka hasilnya akan lebih efektif.

5) Pd gambar 3-3

$$K_D = \frac{C_B}{C_A}$$

$$W_0 = W_A + W_B$$

$$W_A = C_A V_A$$

$$W_B = C_B V_B$$

$$\text{fraksi A} = \frac{W_A}{W_0} = \frac{C_A V_A}{W_A + W_B}$$

$$= \frac{C_A V_A}{C_A V_A + C_B V_B}$$

$$= \frac{V_A}{V_A + \frac{C_B}{C_A} V_B}$$

$$= \frac{V_A}{V_A + K_D V_B}$$

$$W_{AI} = W_0 \left(\frac{V_A}{V_A + K_D V_B} \right)^5$$

zat yg tersisa di lapisan air

$$W_{AI} = 4 \left(\frac{500 \text{ ml}}{500 \text{ ml} + 3(100 \text{ ml})} \right)^5$$

→ V. eter

$$= 4 \left(\frac{500 \text{ ml}}{800 \text{ ml}} \right)^5$$

$$= 4 (0,625)^5$$

$$= 4 (0,095)$$

$$= 0,38 \text{ asam bukrat yg tersisa dilapisan air}$$