

3-1

Berapa nilai K_D minimum yang memungkinkan ekstraksi 99,9% zat terlarut dari 50 ml air dengan lima kali berturut-turut 50 ml eter

Diketahui : $V_0 = 50 \text{ ml}$

$V_a = 50 \text{ ml}$

$n = 5$

% E = 99,9%

$W_A = 100\% - 99,9\% = 0,1\%$

$$= \frac{0,1}{100} \times 1 \text{ gram} = 0,001 \text{ gram}$$

Penyelesaian :

$$W_A = W_0 \left(\frac{V_a}{V_a + K_D \cdot V_0} \right)^n$$

$$0,001 \text{ gram} = 1 \text{ gram} \left(\frac{50 \text{ ml}}{50 \text{ ml} + K_D \cdot 50 \text{ ml}} \right)^5$$

$$\left(0,001 \text{ gram} = 1 \text{ gram} \left(\frac{1}{1 + K_D} \right)^5 \right)^{1/5}$$

$$(0,001 \text{ gram})^{1/5} = \left(\frac{1}{1 + K_D} \right)^1$$

$$0,25 (1 + K_D) = 1$$

$$0,25 + 0,25 K_D = 1$$

$$0,25 K_D = 1 - 0,25$$

$$0,25 K_D = 1 - 0,25$$

$$0,25 K_D = 0,75$$

$$K_D = \frac{0,75}{0,25}$$

$$K_D = 3$$

No. _____

Date : _____

3-2

Diketahui : $V_a = 100 \text{ ml}$ $\% E = 90 \%$ $V_o = 90 \text{ ml}$ $W_A = 100\% - 90\% = 10\%$ $n = 5$ $= \frac{10\% \times 1 \text{ gram}}{100} = 0,1 \text{ gram}$ $W_o = 1 \text{ gram}$

Penyelesaian :

$$W_a = W_o \left(\frac{V_a}{V_a + K_D \cdot V_o} \right)^n \times 1/n$$

$$(W_a)^{1/n} = 1 \left(\frac{V_a}{V_a + V_o \cdot K_D} \right)$$

$$(V_a + V_o K_D) = \frac{V_a}{W_a^{1/n}}$$

$$K_D = \frac{(V_a / W_a^{1/n} - V_a)}{V_o}$$

$$\% E = 90\%, \text{ maka } K_D = \frac{100}{0,1^{1/5} - 100}$$

$$K_D = \frac{100}{0,631 - 100}$$

$$K_D = \frac{158,47 - 100}{90}$$

$$K_D = 0,64966$$

☐ % E untuk 10 kali

☐ $\Rightarrow (100\% - x\%) \text{ gram} = 0,01 \text{ gram}$

☐ $\frac{100}{100} - x\% = 0,01 \text{ gram}$

☐ $x\% = 1 - 0,01 \text{ gram}$

☐ $x\% = 0,99$

☐ $x = 99\%$