No.

Date.

3.1 What is the minimum value of KD which would allow the extraction of 99,9 % of a solute from 50 mL of water five successive 50 mL portions of ether?

Answer :

$\%\ E = 99,9\ \%$

$V_o = 50\ mL$

$V_a = 50\ mL$

$n = 5$

$W_A = 100\ \% - 99,9\ \% = \frac{0,1\ \%}{100} \times 1\ gram$

$= 0,01\ gram.$

Jawab :

$$W_A = W_o \left(\frac{V_a}{V_a + KD.V_o} \right)^n$$

$$0,001\ gr = 1\ gr \left(\frac{50\ mL}{50\ mL + 50\ mL\ KD} \right)^5$$

$$(0,001\ gr)^{1/5} = 1\ gr \left(\frac{1}{1 + KD} \right)^1$$

$0,2511\ (1+D) = 1$

$0,2511 + 0,2511\ KD = 1 - 0,2511$

$0,2511\ KD = 0,7489$

$KD = 2,98 \simeq 3.$

3.2. Dik :

$\%\ E = 90\ \%$

$V_a = 100\ mL$

$V_o = 90\ mL$

No.

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$n = 5$

w_o = 1 gram

w_a = 100 % - 90 % = 10 % x 1 gr = 0,1 gr

Jawab :

~~$w_a = 100\% -$~~

$$\left[w_a = w_o \left(\frac{V_a}{V_a + V_o k_D} \right)^n \times 1/n \right]$$

w_o = 1 gram

$$(w_a)^{1/n} = 1 \left(\frac{V_a}{V_a + V_o k_D} \right)$$

$$(V_a + V_o k_D) = \frac{V_a}{w_a{}^{1/n}}$$

$$k_D = \frac{\left(\frac{V_a}{w_a{}^{1/n}} - V_a \right)}{V_o}$$

$$\%E = 90\% \Rightarrow k_D = \frac{100}{0,1 \cdot {}^{1}/_{5}} - 100$$

$$k_D = \frac{\frac{100}{0,631} - 100}{90}$$

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

$$k_D = 0,64966$$

% E untuk 10 kali

$(100\% - x\%)$ gr = 0,01 gr

$\frac{100}{100} - x\%$ = 0,01 gr

$x\%$ = 1 - 0,01 gr

$x\%$ = 0,99 gr

x = 99 %