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Questions And problems

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3-1 Berapakah nilai minimum K_a yang memungkinkan ekstraksi 99,9% zat terlarut dari 50 ml air dengan 100 ml 5 bagian eter 50 ml berturut-turut? Ans: $K=3$ ~~3.2~~.

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3-2 Jika lima ekstraksi dengan 100 ml bagian ekstrak eter 90% zat terlarut dari larutan berair, berapa fraksi zat terlarut yang akan dihilangkan sepuluh ekstraksi serupa? Ans: 99%

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3-3 Turunkan ekspresi yang mirip dengan persamaan 3-10 untuk distribusi piridin antara air dan benzena: C, H, N + $H-C, H, NH$ (dalam air)

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☐ Jawaban☐☒ 3-1 Dik :☐ % E = 99,9 %☐ $V_a = 50 \text{ ml}$ ☐ $V_o = 50 \text{ ml}$ ☐ $W_a = 100 \% - 99,9 \% = 0,1 \%$ ☐ $= 0,001 \text{ gr}$ ☐ $n = 5$ ☐

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

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

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

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

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

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

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

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$$= 3 //$$



3-2

Dik :

$$\% F = 90 \%$$

$$V_a = 100 \text{ ml}$$

$$V_D = 90 \text{ ml}$$

$$n = 5$$

$$W_0 = 1 \text{ gram}$$

$$W_a = 100 \% - 90 \% = 10 \% \times 1 \text{ gr}$$

$$= 0,1 \text{ gr}$$

maka

$$\left(W_a = W_0 \left(\frac{V_a}{V_a + V_D \cdot K_D} \right)^n \right) \approx 1/n$$

$$W_a = 1 \text{ gram}$$

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

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

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

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$$\% E = 90\%, \Rightarrow KD = \frac{100}{0,1015} - 100$$
$$90$$

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

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

$$KD = 0,64966$$

% E u/ 10 Kali maka :

$$(100\% - X\%) \text{ gr} = 0,01 \text{ gr}$$

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

$$X\% = 1 - 0,01 \text{ gr}$$

$$X\% = 0,99$$

$$X = 99\%$$

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