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Berapakah nilai minimum K_D yang memungkinkan ekstraksi 99.9% zat terlarut dari 50 ml air dengan 5 bagian eter 50 ml berturut-turut?

Jawab :

$$\% E = 99.9\% \quad V_A = 50 \text{ ml}$$

$$V_0 = 50 \text{ ml} \quad n = 5$$

$$W_A = 100\% - 99.9\% = \frac{0.1\%}{100} \times 1 \text{ gram} = 0.001 \text{ gram}$$

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

$$0.001 \text{ gr} = 1 \text{ gr} \left(\frac{50 \text{ ml}}{50 \text{ ml} + 50 \text{ ml} \cdot K_D} \right)^5$$

$$\left(0.001 \text{ gr} = 1 \text{ gr} \left(\frac{1}{1 + K_D} \right)^5 \right)^{1/5}$$

$$(0.001 \text{ gr})^{1/5} = \left(\frac{1}{1 + K_D} \right)^1$$

$$0.2511 \quad 1 + D = 1$$

$$0.2511 + 0.2511 D = 1$$

$$0.2511 K_D = 1 - 0.2511$$

$$\rightarrow 0.2511 K_D = 0.7489$$

$$K_D = 2.98 \approx 3 //$$