Comparing One Large Wash With Two Small Washes

Scoring guide · one credit per question · review written work against each rubric

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Question 1

Choice (2)

The 12 mg is distributed at the same concentration across two plus two liters, giving 3 mg/L.

Question 2

P removes two liters at 3 mg/L, or 6 mg. Q equilibrates 12 mg across three liters, giving 4 mg/L. Its first wash removes one liter at that concentration, or 4 mg.

Question 3

Q starts its second wash with 8 mg left in the two-liter layer. After adding one liter, the concentration is 8/3 mg/L, so the second wash removes about 2.67 mg. Q removes about 6.67 mg overall, compared with 6 mg for P.

Question 4

Removing the first wash in Q takes away 4 mg before the second contact. Fresh wash then equilibrates with only 8 mg in the original layer. Adding both liters at once makes a single equilibrium with all 12 mg.

Question 5

With the stronger wash first, 12 mg distributes between two retained liters and one wash liter at twice the retained concentration. The retained layer holds 6 mg. The original wash then leaves two thirds of 6 mg, or 4 mg. In the reverse order the original wash leaves 8 mg and the stronger wash leaves half of that, also 4 mg.