Reading an Equilibrium With a Total-Particle Sensor

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

Reading an Equilibrium With a Total-Particle Sensor

Question 1

A is the combined count minus the B-only count. The three readings give 90 − 30 = 60, 90 − 48 = 42, and 90 − 60 = 30 A particles.

Question 2

Choice (3)

Only the final reading has B:A equal to 60:30, or 2:1.

Question 3

The total stays 90 because each conversion preserves the total count. The B-only sensor changes from 30 to 60, and the initial B:A ratio is 1:2 rather than the required 2:1.

Question 4

The new total is 60. At equilibrium two thirds are B, so the sensor will read 40. A will account for the remaining 20.

Question 5

A particles can still become B, and B particles can still become A. At equilibrium the forward and reverse conversions occur at equal average rates, keeping both counts steady.