Checking a Reading With an Internal Reference

Base your answers on the information provided and your knowledge of chemistry. Use the 2025 Chemistry Reference Tables as needed.

A dye meter reads a sample dye and a separate reference marker in the same liquid. The reference is always present in the same amount. In the model a change in lamp output multiplies both readings by the same factor. Under standard lamp output the reference reading is 10. At standard lamp output the dye reading is proportional to the dye amount.

Run	Sample dye reading	Reference reading
P	6	10
Q	9	15

1 What factor describes the reference reading in Q compared with standard lamp output?

(1) 0.5

(2) 1.0

(3) 1.5

(4) 2.5

2 Find the dye reading Q would give at standard lamp output. [1]

Answer and work

3 A student uses the raw readings alone to report more dye in Q. Explain how the reference changes the interpretation. [1]

Answer and work

A new lamp measures the same fixed sample and reference amounts as run P. Under the new lamp the dye reads nine and the reference reads 12.

4 Use the new readings to determine whether one multiplier can correct both channels. Compare each reading with its original value in P. [1]

Answer and work