Correcting Two Isotope Counts in a Detector

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

Correcting Two Isotope Counts in a Detector

Question 1

Choice (4)

The detector counts half the arriving boron-10 atoms. Twenty recorded atoms represent 40 arriving atoms.

Question 2

The corrected counts are 40 at 10 u and 20 at 11 u. Their average is (40 × 10 + 20 × 11)/60, or 10.33 u.

Question 3

Boron-11 is half of the recorded atoms (20 of 40) but only one third of the arriving atoms (20 of 60). The detector gives too much weight to the heavier isotope, which raises the recorded mean.

Question 4

Half of the 40 boron-10 atoms is 20. Half of the 20 boron-11 atoms is 10. The ratio is still 2:1, so both isotopes keep the correct relative weight.