Reading Decay Events With Three Energy Gates

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

A decay simulation produces events in three energy bands. A detector records one count for each event that passes its selected gate. Gate L records all three bands. Gate M records the middle and high bands. Gate H records only the high band. All readings use the same simulated event record.

Gate	**Counts from the first record**
L	35
M	20
H	5

1 Which reading directly gives the high-band event count?

(1) 35

(2) 20

(3) 15

(4) 5

2 Calculate the event count in each of the other two bands. [1]

Answer and work

3 A student keeps only L and H. Explain why those two gates cannot recover the middle-band count without another reading. [1]

Answer and work

A model screen changes the readings to 33 on L, 20 on M, and five on H. The original event record before the screen is unchanged.

4 Use all three gate readings to identify which band lost counts at the detector and how many it lost. [1]

Answer and work