Reading a Steady Reactant in a Flow Model

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

A classroom flow model feeds dissolved reactant R into a vessel. The feed adds R particles without an appreciable change to the volume. The reaction turns one R particle into one product particle. The feed and reaction are the only changes to the amount of R in this model.

Interval	R entering per second	R used per second	Amount of R at end
First 10 s	4	2	60
Next 10 s	4	4	60

1 Which statement describes the balance of R during the second interval?

(1) R stops entering and stops reacting.

(2) R enters faster than it reacts.

(3) R reacts faster than it enters.

(4) R enters and reacts at equal rates.

2 Calculate the increase in the amount of R during the first ten seconds. [1]

Answer and work

3 A student says the unchanged amount of R proves that no product forms during the second interval. Use the records to evaluate the claim. [1]

Answer and work

The feed is then turned off. For the first two seconds after that change the reaction still uses four R particles per second.

4 Calculate the amount of R after those two seconds. Explain why the reading now changes. [1]

Answer and work