Checking a Steady Pressure During a Reaction

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

Two classroom simulations produce gas in identical rigid chambers at constant temperature. Chamber P is sealed. Chamber Q has an outlet leading to a collector that records every gas molecule that leaves Q. No gas enters either chamber. The pressure records show the gas still inside each chamber.

Chamber	Pressure at 10 s (kPa)	Pressure at 20 s (kPa)	Gas collected outside from 10 to 20 s (model units)
P	110	120	0
Q	110	110	10

1 Which reading shows that some gas left Q during the interval?

(1) Its pressure is 110 kPa at 10 s.

(2) Its pressure is 110 kPa at 20 s.

(3) Its collector records 10 gas units.

(4) The collector outside P records zero.

2 A student says Q stopped forming gas because its pressure stayed constant. Explain how the collector reading challenges this claim. [1]

Answer and work

A follow-up starts like Q. At 20 s the model closes the outlet. The reaction continues to make gas at the same rate for the next two seconds. No gas can then leave.

3 Predict the direction of the pressure change during those two seconds and explain why. [1]

Answer and work

A calibration for the original two chambers shows that one added gas unit raises the pressure inside by 1 kPa when no gas leaves. The collector already reports gas in those same units.

4 Compare how many gas units P and Q produced from 10 to 20 s in the original test. Use both the chamber and collector records. [1]

Answer and work