Checking a Moving Divider Between Two Gases

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

A display models a rigid 6.0 L box with a frictionless divider. Gas cannot cross the divider. At rest the gas pressures on the two sides are equal. Both sides begin at 300 K. The model gives the relative amounts of gas in the two compartments.

Side	Relative amount of gas	Starting temperature (K)
A	1	300
B	2	300

1 What are the starting volumes of A and B, respectively?

(1) 1.0 L and 5.0 L

(2) 2.0 L and 4.0 L

(3) 3.0 L and 3.0 L

(4) 4.0 L and 2.0 L

2 Explain why equal pressures on the two sides do not require equal volumes. [1]

Answer and work

The simulation warms A to 600 K while B remains at 300 K. The amounts stay fixed. The divider moves until pressures match again. For equal pressures, the model gives each volume in proportion to the gas amount multiplied by its Kelvin temperature.

3 Calculate the new volume of each side. Show how the new temperature changes the volume ratio. [1]

Answer and work

4 A student claims the equal final volumes prove that gas crossed the divider. Select whether the evidence supports or refutes the claim, and explain. [1]

Select one

- [ ] Supports the claim
- [ ] Refutes the claim

Answer and work