Checking an Air Cushion With Two Loads

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

An exhibit models an air cushion under a platform that can move up and down without friction. Air above the platform exerts 100 kPa. At rest, the gas pressure below balances that outside air pressure plus the pressure due to the load. The sealed cushion keeps the same amount of gas at a fixed temperature.

Load	**Pressure due to load (kPa)**	**Gas volume (L)**
P	20	3.0
Q	50	2.4

1 What is the total gas pressure under load Q?

(1) 50 kPa

(2) 100 kPa

(3) 120 kPa

(4) 150 kPa

2 Use the two measurements to check whether total gas pressure times volume stays constant. [1]

Answer and work

The class moves the model into a chamber where the air above the platform exerts 70 kPa. It uses load Q again. The gas amount and temperature are unchanged.

3 Predict the gas volume under load Q in the chamber. Show your reasoning. [1]

Answer and work

4 Explain why using the load pressure alone would predict no change in volume when the model moves to the chamber. [1]

Answer and work