Checking Pressure After Water Condenses

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

A rigid classroom chamber contains dry air and water vapor. No material enters or leaves. The dry air does not condense. The pressure contributions of dry air and water vapor add, and at fixed volume the pressure of an unchanged amount of either gas is proportional to its Kelvin temperature. The model allows water vapor to condense, but it cannot be taken up by any other process.

Record	Temperature (K)	Dry-air pressure (kPa)	Water-vapor pressure (kPa)
Before cooling	320	96	8.0
After cooling	300	Hidden	3.5

1 What dry-air pressure does the model predict after cooling?

(1) 90 kPa

(2) 93.5 kPa

(3) 96 kPa

(4) 104 kPa

2 Use the predicted dry-air pressure and the measured water-vapor pressure to find the final total pressure. Show the sum. [1]

Answer and work

3 A student attributes the entire water-vapor pressure decrease to the lower temperature, with no condensation. Use a predicted pressure to evaluate the claim. [1]

Answer and work

The chamber warms back to 320 K. The model reports that all condensed water evaporates again and no material is lost.

4 Predict the total pressure after the return to 320 K and explain why both contributions return to their original values. [1]

Answer and work