

Manometers and Gas Laws Cumulative Practice

Name: _____

Manometers: Find the pressures on the gases in the open-end or closed-end tubed manometers. Assume that the liquid in each manometer is mercury (Hg). Show all work!

1. The mercury level in an open-end manometer is 57.0 mm higher in the gas arm tube connected to hydrogen gas. If the atmospheric pressure is 0.985 atm, what is the pressure of hydrogen gas, in **atmosphere (atm)**?

2. An open-end manometer connected to a tank of argon gas has a mercury level 83.0 mm higher in the atmospheric arm. If the atmospheric pressure is 76.9 kPa, what is the pressure of the argon gas in kPa?

3. A closed-end manometer is filled with mercury and attached to a container of nitrogen gas. The height differences of mercury in the two arms is 435 mm. What is nitrogen gas's pressure in kPa, atm, and Torr?

A: _____ kPa → Show Work

B: _____ atm → Show Work

C: _____ Torr → Show Work

4. The mercury level of an open-end manometer is 120.1 mm higher in the atmospheric gas arm than it is to chlorine gas. The atmospheric pressure is 99.8 kPa. What is the pressure of the chlorine gas, in kPa?

Gas Laws: Show correct formulas/equations used, as well as plug corresponding values into used formulas/equations for full credit. Ensure your final answer adheres to significant figures and includes units.

5. A balloon is filled with 35.0 L of helium in the morning when the temperature is 20.0 °C. By noon the temperature has risen to 45.0 °C. What is the new volume of the balloon?
6. A balloon that can hold 85 L of air is inflated with 3.5 moles of gas at a pressure of 1.0 atm. What is the temperature in °C of the balloon?
7. 6.00 L of gas in a piston at a pressure of 1.00 atm is compressed until the volume is 3.55 L. What is the new pressure inside the piston?

8. An airtight container with a volume of 4.25×10^4 L, an internal pressure of 101.325 kPa, and an internal temperature of $15.0\text{ }^\circ\text{C}$ is washed off the deck of a ship and sinks to a depth where the pressure is 175 atm and the temperature is $3.00\text{ }^\circ\text{C}$. What will the volume of the gas inside be when the container breaks under the pressure at this depth?
9. A 30.0 L sample of nitrogen inside a rigid, metal container at $20.0\text{ }^\circ\text{C}$ is placed inside an oven whose temperature is $50.0\text{ }^\circ\text{C}$. The pressure inside the container at $20.0\text{ }^\circ\text{C}$ was at 3.00 atm. What is the pressure of the nitrogen after its temperature is increased?
10. **CHALLENGE:** If 5.00 moles of O_2 and 3.00 moles of N_2 are placed in a 30.0 L tank at $255\text{ }^\circ\text{C}$, what will the pressure of the resulting mixture of gases be?

