

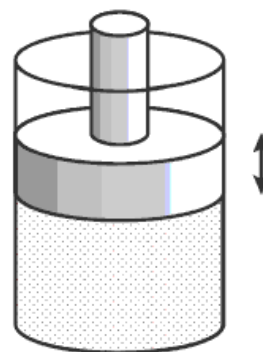
HW 12.2 - Gas Laws

Name:.....

1. The molecules of a fixed mass of gas at room temperature have an average velocity of 0 m/s. Explain the apparent contradiction with the relationship:

Absolute temp is proportional to the mean kinetic energy of the particles.

2. A cylinder with a movable piston contains gas at a temperature of $27.0\text{ }^{\circ}\text{C}$, a volume of 1.50 m^3 , and an absolute pressure of $0.200 \times 10^5\text{ Pa}$. What will be its final temperature if the gas is compressed to 0.700 m^3 and the absolute pressure increases to $0.800 \times 10^5\text{ Pa}$.



3. The pressure of an ideal gas is cut in half, resulting in a decrease in temperature to three fourths of the original value. Calculate the ratio of the final volume to the original volume of the gas. (This is a classic multiple choice style question - do the same way as the gravitational MC questions - use algebra).

4. A weather balloon is designed to expand to a maximum radius of 20 m (which is BIG) when in flight at its working altitude, where the air pressure is 0.030 atm and the temperature is 200 K. If the balloon is filled at atmospheric pressure and 300 K, what is the radius at lift off?



5. A gas cylinder at a party shop has a volume of 0.100 m^3 and starts with a full load of helium gas at a pressure of 150 atm. How many balloons can the tank inflate if we assume that each balloon is a sphere of radius 0.15 m at a pressure of 1.20 atm?