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Gas Law Practice Problems

Gas Molar Volume Calculations: 1 mole of gas = 22.4 L

1. How many liters of volume is occupied by 2.7 mol of O_2 gas?

2. If a gas expands to 7.9 L, how many moles of gas are present?

Gas Variables Calculations: $\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$

1. How does the popping of bubble wrap illustrate the relationship between **pressure** and **volume**?

2. If neon gas has a pressure of 2.00 atm when in a 12 L tank, what is its **pressure** when put in a neon sign where the volume is 2 L?
   - If the gas is being **compressed** into a **smaller volume**, do you expect that the pressure should increase or decrease? _____
   - Perform the calculation:

3. An aerosol can contains 3 L of a compressed gas at a pressure of 4.1 atmospheres. If this gas is sprayed into a plastic bag, what is the volume of the bag if the pressure is 1.0 atmosphere?
   - If the gas is being **released** into an area with **less pressure**, do you expect that the volume should increase or decrease? _____
   - Perform the calculation:

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4. What temperature (in K) is needed to obtain a volume of 5 L **from** a volume of 2 L at 298 K?
   - If the gas is **expanding** and **increasing volume**, do you expect that the temperature increased or decreased? _____
   - Perform the calculation:

5. What is the temperature of 500 L of nitrogen at a pressure of 2.98 atm if it has a temperature of 250 K at a pressure of 3.02 atm and a volume of 400 L?

6. A gas that has a volume of 28 liters, a temperature of 45^0C, and an unknown pressure has its volume increased to 34 liters and its temperature increased to 65 ^{0}C, and a pressure measured to be 2.0 atm. What was the original pressure of the gas? (Hint: Check your temperatures!)

Gas Variables Relationships:

For questions 7-12, complete the statements by writing "**decreases**," "**increases**," or "**remains the same**" on the line provided in regards to the statement below:

As a gas is compressed in a cylinder (volume is decreased)…

7. its mass _____.
8. the number of gas molecules _____.
9. its pressure _____
10. its volume _____.
11. the distance between gas molecules _____.
12. its temperature _____.

13. The theory that explains the behavior of gases in a confined space is called the _____ _____ _____.

14. The Earth's atmosphere has weight, which creates _____ _____. Why do we not notice this normally? When might we notice it?

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15. **Circle one**: If pressure is constant, the volume of a sample of gas **(increases/decreases)** as the temperature increases.

16. What is absolute zero?

Match the variables used to describe gases to their correct units.

_____18. Farenheit (°F)

_____19. Celsius (°C)

_____20. Milliliter (mL)

_____21. Kelvin (K)

_____22. atmospheres (atm)

_____23. Liters (L)

_____23. Kilopascals (kPa)

a. Pressure

b. Temperature

c. Volume