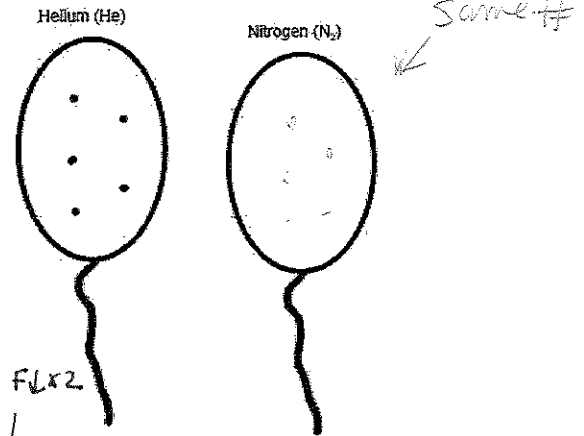


Name
Gas laws review

Complete the following picture

1. In the balloon provided draw the number of particles in the Nitrogen balloon using the He balloon. Both balloons are at 1 atmosphere and 25C.



Short Answer:

Use the Kinetic molecular theory to explain the following statements.

2. In a rigid container the temperature increases causing the pressure to increase.
↑ # of collision
↑ force of collision
3. A balloon is floating up into the air where the atmospheric pressure is reduced causing the balloon to expand.
Inside P > outside pressure
4. A piston has the force on it doubled, causing the volume to decrease and the pressure to decrease.
P ↑ due to increased # of collisions over
5. In a balloon of helium, all the helium particles are traveling the same speed. Justify or nullify.

Nullify, [graph of Maxwell-Boltzmann distribution] average velocity

6. In a rigid container, holding equal amounts of He and oxygen at 25C.
 a. The average kinetic energy of each of these substances are equal. Justify or nullify.
 b. The molecular velocity of these substances are equal. *Nullify O₂ ↓ KE = 1/2 m v² ↓*

7. 15 grams of H₂O is heated until all the gas is evaporated. At 100°C and 1 atm what is the volume of gas as it is released into a balloon?

$$15g H_2O \cdot \frac{1 \text{ mol}}{18.5} = 0.83 \text{ mol}$$

$$PV = nRT$$

$$V = \frac{nRT}{P}$$

$$\frac{0.83 \cdot 0.0821 \cdot 373}{1} = \boxed{25.5 L}$$

8. A car tire is inflated to 1710 mmHg at 6°C. The temperature goes up over the next 9 days to 50°C. What is the new pressure of the tire.

$$P = \text{constant} \quad \frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

$$\frac{1710}{279} = \frac{x}{323}$$

$$x = \boxed{1979 \text{ mmHg}}$$

9. What mass of N₂ gas exerts the same pressure as Cl₂ at STP assuming they are contained in the same 1-liter bottle.

↑ Same # of particles

$$1L \cdot \frac{1}{22.4} = 0.044 \text{ mol Cl} = 0.044 \text{ mol N}_2 \cdot \frac{28}{1} = 1.25 \text{ g N}_2$$

10. An air mattress with a volume of 80L at 13°C is brought to a temperature of 40°C. What is the new volume?

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

$$\frac{80}{286} = \frac{x}{313}$$

$$x = 87.5 L$$