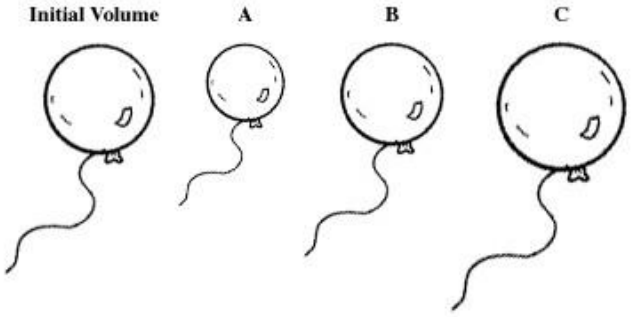
REVIEW QUESTIONS

Chapter 7

Gas Laws:

1. Indicate which diagram represents the volume of the gas sample in a balloon when each of the following changes takes place:



A) The temperature increases at constant pressure:_____

B) The pressure increases at constant temperature:_____

C) Both the pressure and the absolute temperature are doubled:_____

2. The pressure of a sample of gas with a volume of 125 mL is decreased from 2.50 atm to 1.50 atm. What is the new volume?

3. A sample of nitrogen gas with a volume of 10.0 L has a temperature of –78.0°C. What is the volume of this gas at 25.0°C at constant pressure?

4. The pressure of 1.50 L of a gas is doubled and its absolute temperature is increased 3 times. What will the final volume of the gas be?

5. The volume of air in a person's lungs is 615 mL at a pressure of 760 mmHg. When inhalation occurs, the pressure in the lungs drops to 752 mmHg. To what volume did the lungs expand during inhalation?

6. A gas in an aerosol container has a pressure of 1.40 atm at 12°C. What is the pressure in the container if the temperature increases to 35°C?

7. A scuba diver 40 ft below the ocean surface inhales 50.0 mL of compressed air in a scuba tank at a pressure of 3.00 atm at a temperature of 8.0°C. What is the pressure of the air in the lungs if the gas expands to 150.0 mL at a body temperature of 37°C?

STP & Molar Volume:

8. A gas has a volume of 125 mL at 630 mmHg and 27°C. What will the volume be at STP?

9. What volume will 30.0 g of methane gas (CH_4) occupy at STP?

10. Calculate the number of moles of CO_2 in 4.00 L of CO_2 gas at STP.

11. Calculate the volume (mL) occupied by 50.0 g of neon gas at STP.

12. How many grams of aluminum will react with 12.0 L of oxygen at STP as shown below:

$$4\ Al\ (s)\ +\ 3\ O_2\ (g)\ \rightarrow\ 2\ Al_2O_3\ (s)$$

13. What is the molar mass of a gas if 1.15 g of the gas has a volume of 225 mL at STP?

14. How many liters of oxygen gas are required to completely react with 12.0 L of propane at constant temperature and pressure, as shown below:

$$C_3H_8\ (g)\ +\ 5\ O_2\ (g) \rightarrow\ 3\ CO_2\ (g) +\ 4\ H_2O\ (g)$$

Ideal Gas Law:

15. What volume is occupied by 15.0 g of HCl gas at 715 mmHg and 90°C?

16. A 10.0-g sample of krypton has a temperature of 25°C at 575 mmHg. What is the volume (mL) of this gas at these conditions?

17. A sample of gas occupies 855 mL at 1.20 atm and 18°C. How many moles of gas are present in this sample?

18. A steel cylinder with a volume of 15.0 L is filled with 50.0 g of nitrogen gas at 25°C. What is the pressure of the nitrogen gas in the cylinder?

Partial Pressure:

19. An anesthetic consists of a mixture of cyclopropane gas (C_3H_6) and oxygen gas. If the mixture has a total pressure of 1.09 atm, and the partial pressure of the cyclopropane is 73 mmHg, what is the partial pressure of the oxygen in mmHg?

20. A gas mixture consists of nitrogen (425 torr), oxygen (115 torr) and helium (225 torr). What is the total pressure of this mixture in torrs?

21. A gas mixture contains helium and argon gases with a total pressure of 1.20 atm. If there is twice as much helium in the mixture as argon, what is the partial pressure of each gas in the mixture?