

- A sample of a gas is contained in a closed rigid cylinder. According to kinetic molecular theory, what occurs when the gas inside the cylinder is heated?
 - The number of gas molecules increases.
 - The number of collisions between gas molecules per unit time decreases.
 - The average velocity of the gas molecules increases.
 - The volume of the gas decreases.
- Under which conditions of temperature and pressure would helium behave most like an ideal gas?
 - 50 K and 20 kPa
 - 50 K and 600 kPa
 - 750 K and 20 kPa
 - 750 K and 600 kPa
- Two basic properties of the gas phase are
 - a definite shape and a definite volume
 - a definite shape but no definite volume
 - no definite shape but a definite volume
 - no definite shape and no definite volume
- An assumption of the kinetic theory of gases is that the particles of a gas have
 - little attraction for each other and a significant volume
 - little attraction for each other and an insignificant volume
 - strong attraction for each other and a significant volume
 - strong attraction for each other and an insignificant volume
- Which gas is *least* likely to obey the ideal gas laws at very high pressures and very low temperatures?
 - He
 - Ne
 - Kr
 - Xe *Bigger is least*
- A real gas behaves more like an ideal gas when the gas molecules are
 - close and have strong attractive forces between them
 - close and have weak attractive forces between them
 - far apart and have strong attractive forces between them
 - far apart and have weak attractive forces between them
- Which gas would behave most nearly like an ideal gas at STP?
 - CO₂
 - H₂
 - Cl₂
 - NH₃

- The table below shows mass and volume data for four samples of substances at 298 K and 1 atmosphere.

Masses and Volumes of Four Samples

Sample	Mass (g)	Volume (mL)
A	30.	60.
B	40.	50.
C	45	90.
D	90.	120.

Which two samples could consist of the same substance?

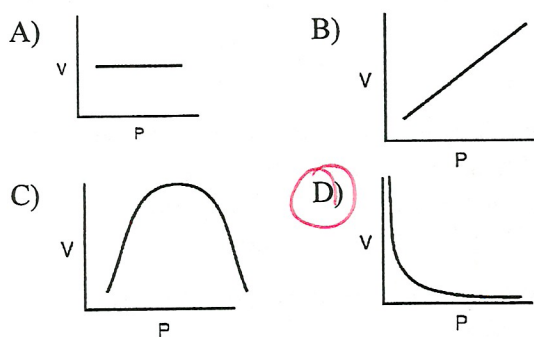
- A and B
 - A and C *same density*
 - B and C
 - C and D
- $D = \frac{m}{V}$*
- A sample of oxygen gas is sealed in container X. A sample of hydrogen gas is sealed in container Z. Both samples have the same volume, temperature, and pressure. Which statement is true? *same PVT \Rightarrow same n*
 - Container X contains more gas molecules than container Z.
 - Container X contains fewer gas molecules than container Z.
 - Containers X and Z both contain the same number of gas molecules.
 - Containers X and Z both contain the same mass of gas.
 - A sample of helium gas has a volume of 900. milliliters and a pressure of 2.50 atm at 298 K. What is the new pressure when the temperature is changed to 336 K and the volume is decreased to 450. milliliters? *$P_1 = 2.50 \text{ atm}$ $P_2 = X$
 $V_1 = 900 \text{ mL}$ $V_2 = 450 \text{ mL}$
 $T_1 = 298 \text{ K}$ $T_2 = 336 \text{ K}$*
 - 0.177 atm
 - 4.43 atm
 - 5.64 atm
 - 14.1 atm
 - A gas occupies a volume of 444 mL at 273 K and 79.0 kPa. What is the final kelvin temperature when the volume of the gas is changed to 1880 mL and the pressure is changed to 38.7 kPa?
 - 31.5 K
 - 292 K
 - 566 K
 - 2360 K

*$P_1 = 79.0 \text{ kPa}$ $P_2 = 38.7$
 $V_1 = 444 \text{ mL}$ $V_2 = 1880 \text{ mL}$
 $T_1 = 273 \text{ K}$ $T_2 = X$*

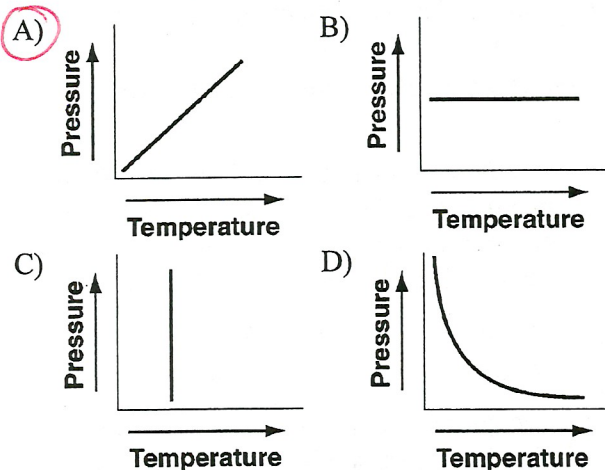
12. A sample of gas is held at constant pressure. Increasing the kelvin temperature of this gas sample causes the average kinetic energy of its molecules to

- A) decrease and the volume of the gas sample to decrease
- B) decrease and the volume of the gas sample to increase
- C) increase and the volume of the gas sample to decrease
- D) increase and the volume of the gas sample to increase

13. Which graph best represents the pressure-volume relationship for an ideal gas at constant temperature?



14. Which graph shows the pressure-temperature relationship expected for an ideal gas?



15. A 3.00-liter sample of gas is at 288 K and 1.00 atm. If the pressure of the gas is increased to 2.00 atm and its volume is decreased to 1.50 liters, the Kelvin temperature of the sample will be

- A) 144 K B) 288 K C) 432 K D) 576 K

$$P_1 = 1.00 \text{ atm} \quad P_2 = 2.00 \text{ atm}$$

$$V_1 = 3.00 \text{ L} \quad V_2 = 1.50 \text{ L}$$

$$T_1 = 288 \text{ K} \quad T_2 = x$$

$$\frac{(1)(3)}{288} = \frac{(2)(1.5)}{x}$$

16. Which temperature change would cause the volume of a sample of an ideal gas to double when the pressure of the sample remains the same?

- A) from 200°C to 400°C
- B) from 400°C to 200°C
- C) from 200 K to 400 K
- D) from 400 K to 200 K

17. As the temperature of a gas increases at constant pressure, the volume of the gas

- A) decreases
- B) increases
- C) remains the same

18. A sample of a gas occupies 6.00 liters at a temperature of 200. K. If the pressure remains constant and the temperature is raised to 600. K, the volume of the gas sample would be

- A) 18.0 L
- B) 2.00 L
- C) 3.00 L
- D) 12.0 L

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

$$\frac{6}{200} = \frac{x}{600}$$

19. The volume of a sample of a gas is 1.0 liter at STP. If the pressure remains constant and the temperature is raised to 546 K, the new volume of the gas will be

- A) 0.25 L
- B) 2.0 L
- C) 0.50 L
- D) 4.0 L

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

$$\frac{1.0}{273\text{K}} = \frac{x}{546\text{K}}$$

20. Under which conditions will the volume of a given sample of a gas decrease?

- A) decreased pressure and decreased temperature
- B) decreased pressure and increased temperature
- C) increased pressure and decreased temperature
- D) increased pressure and increased temperature

21. At STP, which gas diffuses at the faster rate?

- A) H₂ B) N₂ C) CO₂ D) NH₃