

Teacher's Tools[®] Chemistry

Gases and Stoichiometry: Ideal Gas Law: Worksheet 1

1. A sample of pure gas at 27°C and 380 mm Hg occupied a volume of 492 ml. What is the number of moles of gas in this sample? ($R = 0.0821 \text{ L}\cdot\text{atm} / \text{K}\cdot\text{mole}$)

(A) 0.010 mole (B) 7.6 moles (C) 10 moles (D) 6×10^{21} moles (E) none of these choices

2. A sample of ideal gas was heated at constant volume from 25°C to a temperature sufficient to exactly double the pressure. What was the temperature of the gas sample? ($R = 0.0821 \text{ L}\cdot\text{atm} / \text{K}\cdot\text{mole}$)

(A) 50°C (B) 100°C (C) 298 K (D) 596 K (E) cannot be determined.

3. A hydrogen gas thermometer has a volume of 100 ml at 0°C. When immersed in a low-temperature liquid the volume of the gas fell to 87.2 mL. What was the temperature of the liquid? ($R = 0.0821 \text{ L}\cdot\text{atm} / \text{K}\cdot\text{mole}$)

(A) -35°C (B) 13°C (C) 35 K (D) 0.0872°C (E) 273 K

4. A 22.4 liter sample of gas at STP weighs 16.0 grams. What is the molecular weight of the gas?

(A) 22.4 g/mol (B) 16.0 g/mol (C) 29.4 g/mol (D) 12.0 g/mol (E) 32.0 g/mol

5. A gas occupies a 1.5 liter container at 25°C and 2.0 atm. If the gas is transferred to a 3.0 liter container at the same temperature, what will be the new pressure?

(A) 1.0 atm (B) 2.0 atm (C) 3.0 atm (D) 4.0 atm (E) 5.0 atm

6. One mole of nitrogen, two moles of neon, and four moles of argon are sealed in a cylinder. The combined pressure of the gases is 1400 mm Hg. What is the partial pressure of nitrogen in the cylinder?

(A) 100 mm Hg (B) 200 mm Hg (C) 400 mm Hg (D) 500 mm Hg (E) 1400 mm Hg

7. At STP hydrogen gas is

- (A) 1/8 as heavy as oxygen gas.
- (B) 8 times heavier than oxygen gas.
- (C) 1/10 as heavy as air.
- (D) 1/16 times as heavy as oxygen gas.

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8. What is the density of sulfur dioxide gas at STP?
(A) 0.72 g/L (B) 1.43 g/L (C) 2.86 g/L (D) 17.7 g/L (E) 64.09 g/L
9. 200 mL of a gas at constant pressure is heated from 0°C to 100°C. In order to determine the new volume, the initial volume must be multiplied by
(A) 0/100 (B) 100/0 (C) 273/373 (D) 373/273
10. If you wish to find the corrected volume of a gas which was at 20°C and 760 mm pressure, and conditions were changed to 0°C and 700 mm pressure, by what fractions, would you multiply the original volume?
(A) $(293 \times 760)/(273 \times 700)$
(B) $(273 \times 700)/(293 \times 760)$
(C) $(273 \times 760)/(293 \times 700)$
(D) $(293 \times 700)/(273 \times 760)$
11. If the density of a gas is 1.43 g/L at STP, what is the density of the gas at 25°C and 1 atm. pressure?
(A) 1.95 g/L (B) 1.31 g/L (C) 1.57 g/L (D) none of the above
12. When a sample of oxygen gas in a closed container of constant volume is heated until its absolute temperature is doubled, which of the following is also doubled?
(A) The density of the gas.
(B) The pressure of the gas.
(C) The average velocity of the gas molecules.
(D) The number of molecules per cm³.
(E) The potential energy of the molecules.
13. The density of an unknown gas is 4.20 grams per liter at 3.00 atmospheres pressure and 127°C. What is the molecular weight of this gas? (R = 0.0821 atm•L/mol•K)
(A) 14.6 g/mol (B) 46.0 g/mol (C) 88.0 g/mol (D) 94.1 g/mol (E) 138 g/mol