

Workbook



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Gases

Properties of Gases

Questions

1) Convert each pressure to an equivalent pressure in standard atmospheres.

- a. 654 mmHg
- b. 723 Torr
- c. 46.2 cm Hg
- d. 435 kPa

Answer Key

- 1) a. 0.861 atm
b. 0.951 atm
c. 0.608 atm
d. 4.29 atm

Gas Laws

- 1) A sample of $\text{O}_2(\text{g})$ has a volume of 25.4 L at 735 Torr.
What is the new volume if the pressure is
 - a. lowered to 367 Torr
 - b. increased to 4.02 atm
- 2) A 1900 L tank is first evacuated and then connected to a 32.9 L cylinder, of compressed argon gas.
If the temperature is held constant and the final pressure is 763 mmHg, what must have been the original gas pressure in the cylinder, in atmospheres?
- 3) We want to increase the volume of a fixed amount of gas from 54.5 mL to 147 mL, while holding the pressure constant.
To what value must we change the temperature if the initial temperature is 27 °C?
- 4) What is the mass of argon gas in a 63 mL volume at STP?
- 5) A 33.2 mL sample of PH_3 gas is obtained at STP. How many molecules of PH_3 are present?
- 6) What is the volume, in mL, occupied by 92.3 g $\text{CO}_2(\text{g})$ at 42°C and 754 mmHg?
- 7) $\text{Kr}(\text{g})$ in a 16.7 L cylinder exerts a pressure of 13.4 atm at 25.9 °C.
How many grams of gas are present?
- 8) A 0.536 g sample of a gas has a volume of 127 mL at 75.4 °C and 736 mmHg.
What is the molar mass of this gas?
- 9) A particular application calls for $\text{N}_2(\text{g})$ with a density of 1.72 at 28 °C.
What must be the pressure of the $\text{N}_2(\text{g})$ in milliliters of mercury?

General Chemistry Workbook

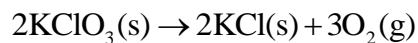
10) Consider air to have a molar mass of $29.57 \frac{\text{g}}{\text{mol}}$.

Determine the density of air at $30\text{ }^\circ\text{C}$ and 1.26 atm , in $\frac{\text{g}}{\text{L}}$.

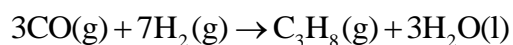
11) What volume of $\text{O}_2(\text{g})$ is consumed in the combustion of $72.8\text{ L C}_3\text{H}_8(\text{g})$, if both gases are measured at STP?

12) A 2.49 g sample of a KCl-KClO_3 mixture is decomposed by heating, and produces $212\text{ mL O}_2(\text{g})$, measured at $24.5\text{ }^\circ\text{C}$ and 97 kPa .

What is the mass percent of KClO_3 in the mixture?



13) Calculate the volume of $\text{H}_2(\text{g})$, measured at $32\text{ }^\circ\text{C}$ and 722 Torr , required to react with $32.7\text{ L CO}(\text{g})$, measured at $5\text{ }^\circ\text{C}$ and 745 Torr .



Answer Key

- 1) a. 50.87 L
b. 6.11 L
- 2) 59 atm
- 3) 536 °C
- 4) 0.112 g
- 5) $8.91 \cdot 10^{20}$ molecules
- 6) 54,670 mL
- 7) 765.09 g
- 8) $124.36 \frac{\text{g}}{\text{mol}}$
- 9) 1,155.2 mmHg
- 10) $1.5 \frac{\text{g}}{\text{L}}$
- 11) 364 L
- 12) 27%
- 13) 86.6 L