

Math Gas Law Questions (for Introductory Chemistry) (Answers)

1. Convert 4.9×10^2 atm to torr.

3.7 X 10^5 torr

2. A flexible vessel contains 35 L of gas when the pressure is 1.2 atm. What will the volume be when the pressure is 0.76 atm, the temperature remaining constant? Which gas law is relevant? _____

55 L

3. A sample of gas in a balloon at 5.56 L and 17.0°C is heated to 37.0°C . What is the new volume of the gas assuming the pressure is unchanged. Which gas law is relevant? _____

5.94 L

4. The volume of a sample of gas measured at 26.85°C and 1.00 atm is 10.0 L. What must the final temperature (in Celsius) be in order for the gas to have a final volume of 7.50 L at 1.50 atm pressure? Which gas law is relevant? _____

64.4°C

5. How many moles of gas are in a gas sample occupying 1.42 L at 581 mm Hg and 307 K? Which gas law is relevant? _____

0.0431 mol

6. An ideal gas at 400 K and 380 mm Hg is contained in a flexible vessel. Its volume is halved but its final pressure is unchanged. What is the final temperature in K? Which gas law is relevant? _____

200 K

7. At 25.0°C and 1.30 atm pressure, it is found that 3.02 L of gas weighs 7.70 g. The calculated molecular mass of the gas is? [Hint: use $PV=nRT$ to calculate the number of moles. This is the number of moles in 7.70 g. Now calculate the molecular mass]

48.0 g

8. (Partial pressure) A sample containing a mixture of helium, neon, and argon has a total pressure (P_t) of 662 mm Hg (Torr). If $P_{\text{He}} = 341$ Torr and $P_{\text{Ne}} = 112$ Torr, what is P_{Ar} ?

209 Torr

9. (Partial pressure) A container at 1 atm ($P_t = 1$ atm) has the following composition: $P_{\text{N}_2} = 573$ Torr, $P_{\text{O}_2} = 100$ Torr, $P_{\text{CO}_2} = 40$ Torr, and $P_{\text{H}_2\text{O}} = 47$ Torr. What is the percent of volume % of O_2 ? What is the mole % of O_2 ?

13.2%; 13.2%