

Ideal Gas Law: Problems

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Problem #1: How many moles of gas are contained in 890.0 mL at 21.0 °C and 750.0 mm Hg pressure?

Problem #2: 1.09 g of H₂ is contained in a 2100mL container at 20.0 °C. What is the pressure in this container in mmHg?

Problem #3: Calculate the volume 3.00 moles of a gas will occupy at 24.0 °C and 762.4 mm Hg.

Problem #4: How many moles of gas would be present in a gas trapped within a 1090.0 mL vessel at 25.0 °C at a pressure of 2.50 atmospheres?

Problem #5: How many moles of a gas would be present in a gas trapped within a 37.0 liter vessel at 80.00 °C at a pressure of 2.50 atm?

Problem #6: What volume will 1.27 moles of helium gas occupy at STP?

Problem #7: At what pressure would 0.150 mole of nitrogen gas at 23.0 °C occupy 8.90 L?

Problem #8: What volume would 32.0 g of NO₂ gas occupy at 3.12 atm and 18.0 °C?

Problem #9: How many moles of gas are contained in a 50.0 L cylinder at a pressure of 100.0 atm and a temperature of 35.0 °C? If the gas weighs 79.14 g, what is its molecular weight?

Problem #10: An amount of an ideal gas at 290.9 K has a volume of 17.05 L at a pressure of 1.40 atm. What is the pressure of this gas sample when the volume is halved and the absolute temperature is multiplied by four?

Problem #11: A balloon has a mass of 0.5 g when completely deflated. When it is filled with an unknown gas, the mass increases to 1.7 g. You notice on the canister of the unknown gas that it occupies a volume of 0.4478 L at a temperature of 50 °C. You note the temperature in the room is 25 °C. Identify the gas.

Problem #12: A 10.20 g sample of a gas has a volume of 5.25 L at 23.0 °C and 751 mmHg. If 2.30 g of the same gas is added to this constant 5.25 L volume and the temperature raised to 67.0 degrees Celsius, what is the new gas pressure?

Problem #13: A gas consisting of only carbon and hydrogen has an empirical formula of CH_2 . The gas has a density of 1.65 g/L at 27.0 °C and 734.0 torr. Determine the molar mass and molecular formula of the gas.

Problem #14: 13.9 grams of an unknown gas is placed in a 5.00 L container. It has an initial pressure at 58.6 kPa and initial temperature at 60.0 °C. What is the name of this gas?

Problem #15: A 19.5 L flask at 15 °C contains a mixture of three gases: N_2 (2.50 mol), He (0.38 mol), and Ne (1.34 mol). Calculate the partial pressure of neon gas in the mixture.

Problem #16: Determine the volume of occupied by 2.34 grams of carbon dioxide gas at STP.

Problem #17: A sample of argon gas at STP occupies 56.2 liters. Determine the number of moles of argon

Problem #18: At what temperature will 0.654 moles of neon gas occupy 12.30 liters at 1.95 atmospheres?

Problem #19: A 30.6 g sample of gas occupies 22.414 L at STP. What is the molecular weight of this gas?

Problem #20: A 40.0 g gas sample occupies 11.2 L at STP. Find the molecular weight of this gas.

Problem #21: A 12.0 g sample of gas occupies 19.2 L at STP. What is the molecular weight of this gas?

Problem #22: 96.0 g. of a gas occupies 48.0 L at 700.0 mm Hg and 20.0 °C. What is its molecular weight?

Problem #23: 20.83 g of a gas occupies 4.167 L at 79.97 kPa at 30.0 °C. What is its molecular weight?

Problem #24: What is the value of and units on R? What is R called ("A letter" is not the correct answer!)?

Problem #25: 5.600 g of solid CO₂ is put in an empty sealed 4.00 L container at a temperature of 300 K. When all the solid CO₂ becomes gas, what will be the pressure in the container?

Problem #26: The pressure in a 1780 mL gas cylinder containing nitrogen is 104.15 Kpa at 20 °C. What is the mass of nitrogen in the cylinder? 48.36 gm.

Problem #27: Starting from Boyle's, Charles's and Avogadro's laws obtain the ideal gas equation?