

Gas Laws

Name: _____

Show set-up and all work (including units) to receive full credit. Round answers to correct number of significant figures.

- 1) A gas in a cylinder with a movable piston occupies 3.5 L at a temperature of 293 K. What will be the gas volume if the temperature is raised to 427 K ?

- 2) A 3.0 ft³ balloon is increased in size by decreasing the pressure around the balloon from 1.1 atm to 0.40 atm. What is the new volume of the balloon?

- 3) A sample of methane (CH₄) gas occupies 700. mL at a temperature of -25.0 °C and a pressure of 500. kPa. What will be the gas temperature (in °C) if the volume is increased to 850. mL and the pressure is raised to 9.50 atm?

- 4) A sample of gas has a pressure of 8.5 psi at 10 K. What will be the new temperature at constant volume if the pressure is increased to 3.0 atm?

- 5) What are the partial pressures of atmospheric gases if the atmospheric pressure is 754 torr and the atmosphere is made up of 78% nitrogen, 21% oxygen, 0.7% carbon dioxide, 0.2% neon, and 0.1% carbon monoxide?

- 6) Knowing that a gas at STP takes up 22.4 L per mole, how many moles are of a gas are present if you have 5.3 L of that gas?

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- 1) A sample of CO occupies 54 m^3 at 750 K and 2250 torr . What is the volume at STP?

- 2) A sample of methane initially occupies 0.850 L at 50.0 kPa and 227°C is compressed to a volume of $150. \text{ ml}$. If the temperature is kept constant, what will be the new pressure?

- 3) A 2.0 m^3 helium balloon at a pressure of 1.0 atm at the earth's surface ascends to a height of 10.0 km above the surface where the air pressure is 0.27 atm . What will be the volume of the balloon at that height (assuming the temperature doesn't change)?

- 4) A mixture of gases in a scuba tank has a total pressure of 300 kPa . If He has a pressure of 0.6 atm and N_2 has a pressure of 825 mmHg , what will be the pressure of the remaining oxygen gas in the tank?

- 5) A 25.0 mL sample of oxygen gas contains 0.079 moles of gas. If more gas were added to the sample that made the volume 0.125 L , how many moles of gas would be present?

- 6) Helium will turn into a liquid at -452°F . In order to make liquid He, one must cool it from STP down to this temperature and a pressure of 225 mm Hg . Suppose you started with one mole of the gas. What would the new volume be under these conditions?