

Gas Calculations Practice

1. A gas sample occupies 300ml at a pressure of 2.00atm. what would the pressure be if the volume was increased to 500ml and the temperature remains constant?
2. A balloon is inflated with helium to a volume of 0.75L at 27°C. If the same balloon was placed in a room at 22°C, what would its new volume be?
3. The temperature of a 200ml sample of gas originally at STP is changed to -25°C at constant volume. Calculate the pressure of the gas in atm.
4. A gas has a volume of 240ml at 25°C at 600mm Hg. Calculate its volume at STP.
5. If 4 moles of a gas at a pressure of 5.4atm has a volume of 120L, what is the temperature?
6. My car has an internal volume of 2600L. If the sun heats my car from a temperature of 20°C to 55°C, what will the pressure be inside my car? Assume the pressure at 20°C was 760mm Hg

7. How many moles of gas are in my car in problem 3?

Individual Practice Problems

1. 3.00 moles of a gas are placed in a 4.55 L container at 245 °C. What is the pressure in kPa?
2. 65.85 grams of nitrogen gas are placed in 17.5 L container. The pressure is 1988 mm Hg. What is the temperature, in °C?
3. A 7.0 L container is filled with 10.0 moles of a gas. The pressure is read at 4.00 atm, what is the temperature of the gas?
4. 155.0 grams of oxygen gas are put in a 4.50 L container at 35 °C. What is the pressure, in kPa?
5. What volume would be occupied by 3.0 moles of nitrogen gas under a pressure of 12156 kPa at 50°C?
6. How many moles of a gas will occupy 900 mL at a pressure of 599.8 kPa and -73°C?

7. 2.50 grams of XeF_4 is introduced into an evacuated 3.00 L container at 80.0°C . Find the pressure in atmospheres in the container.

8. A lighter-than-air balloon is designed to rise to a height of 6 miles high with an atmospheric pressure of 210 mm Hg and the temperature is -40°C . If the full volume of the balloon is 100,000.0 L, how many grams of helium will be needed to inflate the balloon?

9. What is the mass of 18.9 L of NH_3 at 31.0°C and 97.97 kPa?

10. 0.279 moles of O_2 in a 1.85 L cylinder exert a pressure of 3.68 atm. What is the temperature in the cylinder?

11. If I initially have a gas at a pressure of 12 atm, a volume of 23 liters, and a temperature of 200 K, and then I raise the pressure to 14 atm and increase the temperature to 300 K, what is the new volume of the gas?

12. A gas takes up a volume of 17 liters, has a pressure of 2.3 atm, and a temperature of 299 K. If I raise the temperature to 350 K and lower the pressure to 1.5 atm, what is the new volume of the gas?

13. A gas that has a volume of 28 liters, a temperature of 45 °C, and an unknown pressure has its volume increased to 34 liters and its temperature decreased to 35 °C. If I measure the pressure after the change to be 2.0 atm, what was the original pressure of the gas?

14. A gas has a temperature of 14 °C, and a volume of 4.5 liters. If the temperature is raised to 29 °C and the pressure is not changed, what is the new volume of the gas?

15. If I have 17 liters of gas at a temperature of 67 °C and a pressure of 88.89 atm, what will be the pressure of the gas if I raise the temperature to 94 °C and decrease the volume to 12 liters?

16. I have an unknown volume of gas at a pressure of 0.5 atm and a temperature of 325 K. If I raise the pressure to 1.2 atm, decrease the temperature to 320 K, and measure the final volume to be 48 liters, what was the initial volume of the gas?

17. If I have 21 liters of gas held at a pressure of 78 atm and a temperature of 900 K, what will be the volume of the gas if I decrease the pressure to 45 atm and decrease the temperature to 750 K?

18. If I have 2.9 L of gas at a pressure of 5.0 atm and a temperature of 50.0 °C, what will be the temperature of the gas if I decrease the volume of the gas to 2.4 L and decrease the pressure to 3.0 atm?

19. I have an unknown volume of gas held at a temperature of 115 K in a container with a pressure of 60.0 atm. If by increasing the temperature to 225 K and decreasing the pressure to 30.0 atm causes the volume of the gas to be 29 liters, how many liters of gas did I start with?

$$\frac{\text{mass}}{\text{volume}} = \frac{P M_r}{RT}$$

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Density

20. What is the density of an ideal gas with a molecular mass of 50 g/mol at 2 atm and 27°C?

21. The density of SO₂ gas in a container 25°C is 2.51 g/L. Determine the pressure in this flask.

22. A 500.0 ml flask contained O₂ gas at 25.0°C at a pressure of 4.5 atm.

- What is the number of moles in the flask?
- What is the mass of the gas in the flask?
- What is the density of the oxygen in the flask?

23. A 5.0 L flask of carbon dioxide gas at a pressure of 4.54 atm had a mass of 36 g?

- a. How many moles of gas are in this flask?
- b. What is the temperature, in Kelvin and °C, of the gas in this flask?

24. Determine the molar mass of gas in a container at -50.0°C and 6 atm pressure with a density of 14.5 g/L

25. Given 3.43 g of gas in a 2.00 L container at 25.0°C and a pressure of 1140 mm Hg:

- a. Determine the number of moles of gas in the container.
- b. Determine the molar mass of this gas.
- c. What might be the identity of this gas?