1. A gas has an initial volume of 15 L. If the temperature increases from 330 K to 450 K, find the new volume.

2. A sample of oxygen takes up 34 cm3 of space when it is under 500 kPa of pressure. When the pressure is changed to 340 kPa, find the new volume.

3. The pressure of some N2 drops from 315 kPa to 220 kPa. If the initial volume is 1.4 L, find the new volume.

4. The pressure of neon changes from 786 mm Hg to 1811 mm Hg. If the initial temperature 87oC, what is the new temperature (in oC)?

1. A sample of gas under a pressure of 720 mm Hg has a volume of 300. mL. The pressure is changed to 800. mmHg. What volume will the gas then occupy?
2. The gaseous contents in an aerosol can are under a pressure of 3.00 atm at 25°C. Directions on the can caution the user to keep the can in a place where the temperature does not exceed 52°C. What would the pressure of the gas in the aerosol can be at 52°C ?
3. 12.5 grams of nitrogen gas under a pressure of 560. kPa has a volume of 600 mL. If the mass is changed to 4.32 grams, what will the volume be?
4. A quantity of gas has a volume of 400. mL when confined under a pressure of 600. mm Hg. What will the new pressure be if the volume is reduced to 200. mL?
5. An aerosol can contains gasses under a pressure of 4.50 atm at 20.0°C. If the can if left on hot sandy beach, the pressure of the gasses increased to 4.80 atm. What is the Celsius temperature on the beach?
6. A quantity of gas has a volume of 2.00 L at a temperature of -3°C. If the temperature of the gas is raised to 27°C at constant pressure, what volume will the gas occupy.
7. Before a trip from New York to Boston, the pressure in an automobile tire is 1.8 atm at 20°C. At the end of the trip, the pressure gauge reads 1.9 atm. What is the new Celsius temperature of the air inside the tire?
8. Chemistry: *Unit Conversions for the Gas Laws*

|  |  |  |
| --- | --- | --- |
| TEMPERATURE |  | PRESSURE |
| **K** | **oC** | **mm Hg** | **kPa** | **atm** |
| **373 K** | **(D)** | **890 mm Hg** | **(K)** | **(O)** |
| **(A)** | **56oC** | **(G)** | **123 kPa** | **(P)** |
| **(B)** | **154oC** | **(H)** | **(L)** | **0.64 atm** |
| **128 K** | **(E)** | **3140 mm Hg** | **(M)** | **(Q)** |
| **800 K** | **(F)** | **(I)** | **(N)** | **2.35 atm** |
| **(C)** | **–10oC** | **(J)** | **25 kPa** | **(R)** |

*Directions: Complete the following tables, showing your work for each lettered box beside the corresponding letter below. Include units on your work, and write your final answers in the tables.*

1. What volume would 1.5 mol of nitrogen gas occupy at STP?
2. Will the pressure of helium gas be the same as the pressure of oxygen if you have 1 mol of each gas at a volume of 22.4 L and each at 273K? Explain your thinking.
3. How many moles of hydrogen gas are contained in a volume of 2.00L at 280K and 1.5 atm?
4. If I inhale 2.2 liters of gas at a temperature of 18°C and it heats to a temperature of 38°C in my lungs, what is the new volume of the gas?
5. A weather balloon is filled at sea level with 8000L of helium. The pressure at sea level is 1 atm and the temperature is 17°C. Calculate the volume of the balloon at 25,000 ft when the atmospheric pressure has decreased to 0.4 atm.
6. How hot will a 2.3 L balloon have to get to expand to a volume of 400L? Assume the initial temperature of the balloon is 25°C.
7. Find the pressure of 3.40 mol of gas if the temperature is 40.0°C and the gas volume is 22.4L.
8. Butane gas is stored in a tank at a pressure of 10.0 atm and at 22.0°C. The tank can hold a pressure of 50.0 atm before bursting. During a fire the gas is heated to 500.0°C. What is the gas pressure, and will the tank contain the gas without bursting?
9. A balloon contains 30.0 L of helium gas at 103KPa. What is the volume of the helium when the balloon rises to an altitude where the pressure is only 25.0 KPa? Assume that the temperature remains constant.
10. How many moles of helium gas are contained in a 10,000L weather balloon at 1 atm and 10°C.
11. **A mixture of oxygen, hydrogen and nitrogen gases exerts a total pressure of 278 kPa.  If the partial pressures of the oxygen and the hydrogen are 112 kPa and 101 kPa respectively, what would be the partial pressure exerted by the nitrogen?**
12. **A mixture of neon and argon gases exerts a total pressure of 2.39 atm.   The partial pressure of the neon alone is 1.84 atm, what is the partial pressure of the argon gas in kPa?**
13. A 5.0 liter container at 20.0oC has 4 gases pumped in. The total pressure of the gases is 4.80 atm. If the pressure of the first gas is 1.20 atm, and the pressure of the second gas is 0.490 atm, the pressure of the third gas is 0.780 atm, what is the pressure of the fourth gas in atmospheres?
14. 220 mL of oxygen gas was collected over water. The total pressure of oxygen plus water vapor was 745.8 mmHg at 25.0oC. What is the pressure, in mmHg, exerted by only the oxygen gas?
15. Hydrogen gas, H2(g), is collected over water at 20.0oC. The total pressure of hydrogen gas and water vapor is

753 mmHg. What is the pressure, in mmHg, exerted by only the hydrogen gas?