Other Gas Laws Homework

Use the ideal gas law, “PiV-nRT”, and the universal gas constant***R = 0.0821 L\*atm***

 to solve the following problems:***K\*mol***

*If* pressure is needed in kPa then convert by multiplying by *101.3kPa / 1atm* to get

***R =8.31 kPa\*atm / (K\*mole)***

1) If I have 4 moles of a gas at a pressure of 5.6 atm and a volume of 12 liters, what is the temperature?

2) If I have an unknown quantity of gas at a pressure of 1.2 atm, a volume of 31 liters, and a temperature of 87 0C, how many moles of gas do I have?

3) If I contain 3 moles of gas in a container with a volume of 60 liters and at a temperature of 400 K, what is the pressure inside the container?

4) If I have 7.7 moles of gas at a pressure of 0.09 atm and at a temperature of 56 0C, what is the volume of the container that the gas is in?

5) If I have 17 moles of gas at a temperature of 67 0C, and a volume of 88.89 liters, what is the pressure of the gas?

6) If I have an unknown quantity of gas at a pressure of 0.5 atm, a volume of 25 liters, and a temperature of 300 K, how many moles of gas do I have?

1. An unknown gas has a volume of 200L at 5 atm and -140°C. What is its volume at STP?

1. In an autoclave, a constant amount of steam is generated at a constant volume. Under 1.00 atm pressure the steam temperature is 100°C. What pressure setting should be used to obtain a 165°C steam temperature for the sterilization of surgical instruments?

1. Air contains oxygen, nitrogen, carbon dioxide, and trace amounts of other gases. What is the partial pressure of oxygen (PO2) at **101.3kPa of total pressure** if it’s known that the partial pressures of nitrogen, carbon dioxide, and other gases are 79.1kPa, 0.040kPa, and 0.94kPa, respectively? What is the name of the gas law used for this?
2. Explain why the rates of diffusion of nitrogen gas and carbon monoxide gas are almost identical at the same temperature?
3. What distinguishes effusion from diffusion? How are these processes similar?
4. Which of the gases effuses faster at the same temperature: molecular chlorine, nitrogen dioxide, ammonia or molecular nitrogen gas? And why?
5. Explain what each of the following changes would do to the pressure in a closed container (increase or decrease pressure). A) Part of the gas is removed, B) The container size (volume) is decreased, and C)Temperature is increased.
6. Determine the total pressure of a gas mixture that contains oxygen, nitrogen and helium in the following partial pressures of 2.0atm for oxygen, 4.7atm for nitrogen and **253.25kPa** for helium.