

**+WS 5.3 Combined Gas Law - must show work & units!**

STP: 0°C 1 atm (1 mole = 22.4 L)	$\frac{P_i V_i}{T_i} = \frac{P_f V_f}{T_f}$
1 atm = 760 mmHg = 14.7 psi = 101.3 kPa	

1. A 1.30 L balloon is taken from room temperature (25.0°C) and placed into a freezer at -11.5°C. What is its new volume? (isobaric change)

Ans: \_\_\_\_\_

2. A container of oxygen gas is at STP. If this sample is put into an oven at 280°C, what would its pressure be, in kPa? (isovolumetric change)

Ans: \_\_\_\_\_

3. You have a 2.40 L container of air at STP. From out of nowhere, Bigfoot stomps on it, decreasing the container's volume down to 0.500 L and increasing the pressure to 8.00 atmospheres. How hot, in °C, is the air in the container now?

Ans: \_\_\_\_\_

4. You're at the zoo and have a big red 1.80 L helium balloon. The barometric pressure today is 785 mmHg. Then you hear the roar of a lion. Startled, you accidentally release the balloon. It flies away. By the time it reaches the clouds, the atmospheric pressure that high is only 0.300 atmospheres. What would be the volume of the balloon up there? (isothermal change)

Ans: \_\_\_\_\_

5. a) You fill your car's tires to 35 psi when they were cold (12°C). After driving for 3 hours, your car's tires warm up to 38°C. What would be the pressure inside your tires now, in psi? (isovolumetric change)  
b) What is this pressure in atmospheres?

Ans: a) \_\_\_\_\_ b) \_\_\_\_\_

6. A 12.0 L sample of NO<sub>2</sub> gas is at STP. What would be its new volume if its pressure was decreased to 575 mmHg and its temperature was doubled?

Ans: \_\_\_\_\_

7. A 5.75 gram sample of nitrogen gas is at STP. What would be its volume if its temperature was increased to 317°C? (isobaric change) *hint- remember nitrogen is diatomic!*

Ans: \_\_\_\_\_

8. a) A sample of Cl<sub>2</sub> gas occupies a volume of 11.4 L at 3.50 atmospheres. When the Cl<sub>2</sub> is changed to STP conditions, what will be its volume? b) How many molecules of Cl<sub>2</sub> are there? (isothermal change)

Ans: a) \_\_\_\_\_ b) \_\_\_\_\_

Ans (PRO+2): 1.14 1.95 2.60 6.20 9.94 31.7 38.2 39.9 182 205.2 1.07E24 2.71E24  
Units (PRO): L L L L L atm atm psi °C molecules