Extra Problems - Unit 6 Gas Properties Mixed Up

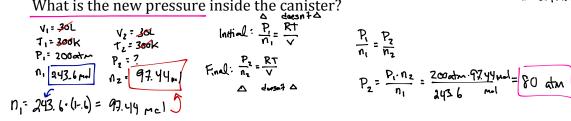
1. A. How many moles of gas are in a 30 liter scuba canister if the temperature of the canister is 300 K and the pressure is 200 atmospheres? PV=nRT

$$V = 30L$$

 $T = 300k$
 $P = 200 \text{dm} \cdot 30L$
 $P = 200 \text{dm} \cdot 30L$

D. After 3 hours under water the number of moles decreases by ...

What is the new pressure inside the canister?



2. A toy balloon has an internal pressure of 1.05 atm and a volume of 5.0 L. If the temperature where the balloon is released is 20°C, what will happen to the volume when the balloon rises to an altitude where the pressure is 0.65 atm and the temperature is -15°C?

3. If divers rise too quickly from a deep dive, they get a condition called "the bends" which is caused by the expansion of very small nitrogen bubbles in the blood due to decreased pressure. If the initial volume of the bubbles in a diver's blood is 15 mL and the initial pressure is 12.75 atm, what is the volume of the bubbles when the diver has surfaced to 1.00 atm pressure?

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$$V_1 = 15mL$$
 $P_1 = 12.75 \text{ dm}$
 $V_2 = \frac{P_1 V_1}{P_2} = \frac{12.75 \text{ dm} \cdot 15mL}{1 \text{ dm}} = \frac{191.25 \text{ mL}}{1 \text{ dm}}$

4. If I have a 50 liter container that holds 45 moles of gas at a temperature of 200° C, what is the pressure inside the container?

5. A bag of potato chips is packaged at sea level (1.00 atm) and has a volume of 315 mL. If this bag of chips is transported to Denver (0.775 atm), what will the new volume of the bag be?

$$P_1 = 1$$
 atm $P_2 = 0.775$ atm $V_1 = 315$ mL $V_2 = ?$

6. It is not safe to put aerosol canisters in a campfire, because the pressure inside the canisters gets very high and they can explode. If I have a 1.0 liter canister that holds 2 moles of gas, and the campfire temperature is 1400° C, what is the pressure inside the canister?

R= 6.082

7. A Los Angeles class nuclear submarine has an internal volume of eleven $\triangle inq$ cond. million liters at a pressure of 1.250 atm. If a crewman were to open one of the hatches to the outside ocean while it was underwater (pressure = 15.75 atm), what be would the new volume of the air inside the submarine?

$$V_1 = 11 \times 10^{6} L$$
 $P_1 = 1.25 \text{ dm}$
 $V_2 = ?$
 $V_2 = ?$
 $V_2 = P_1 U_1 = P_2 U_2$
 $V_3 = 15.75 \text{ dm}$
 $V_4 = P_2 = 1.25 \text{ dm}$
 $V_5 = 1.25 \text{ dm}$
 $V_7 = 1.25 \text{ dm}$
 $V_8 = 1.25 \text{ dm}$

8. I have a balloon that can hold 100 liters of air at STP. If I place the balloon in a freezer and the volume decreases to 80 liters, what is the temperature of the balloon?

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$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$