AP CHEM II WORKSHEET ON THE 'SIMPLE' GAS LAWS PART I

Name:_____Date:_____Period:____

(1) A fixed quantity of a gas at 23 ^{0}C exhibits a pressure of 748 torr and occupies a volume of 10.3 L. Calculate the volume the gas will occupy at 23 ^{0}C if the pressure is increased to 1.55 atm.

(2) What pressure, in torr, is needed to confine an ideal gas to 75.0 L after it has expanded from 25.0 L and 1.00 atm at constant temperature?

(3) A 50.0 L sample of gas from the upper atmosphere at a pressure of 6.50 torr is compressed into a 150**.** mL container at the same temperature.

a. What is the new pressure in atmospheres?

b. To what volume would the original sample have had to be compressed to reach a pressure of 10.0 atm?

(4) A cylinder containing 44.0 L of helium gas at a pressure of 170 atm is to be used to fill toy balloons to a pressure of 1.1 atm. Each inflated balloon has a volume of 2.0 L. What is the maximum number of balloons that can be inflated? (Remember that 44.0 L of helium at 1.1 atm pressure will remain in the 'exhausted' cylinder) Round your answer to two significant digits.

(5) A test of a thermonuclear bomb was conducted in 1965 in Siberia. The device was detonated 1000 meters above ground zero where the temperature was 35.6 ^{0}F. The resulting explosion heated 10 000 ft^3 of air at standard pressure to 1 100 000 K as the outgoing pressure blast-wave developed. By what factor did the air expand? (Assume that the pressure remained constant during the formation of the blast-wave).

(6) If a 15.0 ^{0}C temperature increase causes a 10.0 % increase in the volume of a 832 mL sample of helium gas while the gas pressure is held constant, what was the original temperature?

(7) A gas at a temperature of 99.8 ^{0}C occupies a volume of 641 mL. What will be the volume at a temperature of 5.00 ^{0}C, assuming no change in pressure?

(8) A balloon is filled to a volume of 700**.** mL at a temperature of 20.0 ^{0}C. The balloon is then cooled at constant pressure to a temperature of 100**.** K. What is the final volume of the balloon?

(9) The air in a rigid container has a pressure of 640**.** mm Hg at 23.0 ^{0}C. When placed in sunlight the temperature rose to 48.0 ^{0}C. What is the resulting pressure in the tank?

(10) A sealed glass bulb contains helium at a pressure of 750**.** mm Hg and a temperature of 27.0 ^{0}C. The bulb was packed in dry ice at – 73.0 ^{0}C. What was the resulting pressure of the helium?

(11) An aerosol can at room temperature, 25 ^{0}C, is under a pressure of 10**.** atm at a volume of 0.50 L. If someone releases all of the contents to fill an empty 4.6 L box at standard pressure, what is the temperature, in degrees Celsius, of the contents of the box? (This is why cans feel cold when you discharge their contents)

(12) A sample of freon-12 (CF_2Cl_2) occupies 24.5 L at 298 K and 253.3 kPa. Find its volume at STP.

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(1) **6.54 L**

(2) **253 torr**

(3) **a. 2.85 atm**
b. 42.8 mL

(4) **3400 balloons**

(5) **the air expanded by a factor of 4000**

(6) **150 K**

(7) **478 mL**

(8) **981 mL**

(9) **694 mm Hg**

(10) **500. mm Hg**

(11) **1.2 ^{0}C**

(12) **56.1 L**