

Name \_\_\_\_\_ Date \_\_\_\_\_

## **ALL Gas Laws Practice Packet**

*Directions: Solve all problems. You must show your givens, formula, work (including units), and answer with the correct units & significant figures.*

1. A sample of nitrogen gas ( $N_2$ ) has 1.70 moles and occupies 3.80 L. What volume will it occupy with 2.60 moles?

List Givens	Formula	Givens plugged into Formula:
<b>ANSWER WITH CORRECT UNITS &amp; SIG FIGS:</b>		

2. A mixture of oxygen ( $O_2$ ), carbon dioxide ( $CO_2$ ), and nitrogen ( $N_2$ ) has a total pressure of 0.97-atm. What is the partial pressure of  $O_2$ , if the  $P_{CO_2}$  is 0.70-atm and  $P_{N_2}$  is 0.12-atm?

List Givens	Formula	Givens plugged into Formula:
<b>ANSWER WITH CORRECT UNITS &amp; SIG FIGS:</b>		

3. How many moles of gas occupy 98 L at a pressure of 2.8 atmospheres and a temperature of 292 K?

List Givens	Formula	Givens plugged into Formula:
<b>ANSWER WITH CORRECT UNITS &amp; SIG FIGS:</b>		

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4. If 5.0 moles of  $O_2$  and 3.0 moles of  $N_2$  are placed in a 30.0 L tank at a temperature of  $25^\circ C$ , what will the pressure of the resulting mixture of gases be? (*Hint: Add to get the total number of moles.*)

List Givens	Formula	Givens plugged into Formula:
ANSWER WITH CORRECT UNITS & SIG FIGS:		

5. A balloon is filled with 35.0 L of helium in the morning when the temperature is  $20.0^\circ C$ . By noon, the temperature has risen to  $45.0^\circ C$ . What is the new volume of the balloon?

List Givens	Formula	Givens plugged into Formula:
ANSWER WITH CORRECT UNITS & SIG FIGS:		

6. A gas occupies 13.4 L at 0.830 atm. What will the volume be if the pressure becomes 160 kPa?

List Givens	Formula	Givens plugged into Formula:
ANSWER WITH CORRECT UNITS & SIG FIGS:		

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7. A balloon that can hold 85 L of air is inflated with 3.5 moles of gas at a pressure of 1.0 atmosphere. What is the temperature in °C of the balloon? (*Hint: The calculated answer will be in Kelvin! Convert answer to Celsius.*)

List Givens	Formula	Givens plugged into Formula:
ANSWER WITH CORRECT UNITS & SIG FIGS:		

8.  $\text{CaCO}_3$  decomposes at 1200°C to form  $\text{CO}_2$  gas and  $\text{CaO}$ . If 25 L of  $\text{CO}_2$  are collected at 1200°C, what will the volume of this gas be after it cools to 25°C?

List Givens	Formula	Givens plugged into Formula:
ANSWER WITH CORRECT UNITS & SIG FIGS:		

9. Sally adds 3.13 moles of argon to a 5.29 liter balloon that already contained 2.51 moles of argon. What is the volume of the balloon after the addition of the extra gas?

List Givens	Formula	Givens plugged into Formula:
ANSWER WITH CORRECT UNITS & SIG FIGS:		

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10. A 0.20 mole helium balloon with an internal pressure of 1.00 atm and a volume of 4.50 L at 20.0°C is released. What volume will the balloon occupy at an altitude where the pressure is 0.600 atm, the temperature is —20.0°C and 0.090 moles of helium escaped?

List Givens	Formula	Givens plugged into Formula:
ANSWER WITH CORRECT UNITS & SIG FIGS:		

11. There are 135 L of gas in a container at a temperature of 260°C. If the gas was cooled until the volume decreased to 75 L, what would the temperature of the gas be?

List Givens	Formula	Givens plugged into Formula:
ANSWER WITH CORRECT UNITS & SIG FIGS:		

12. A 5.0 L of a gas is collected at 1.02 atm. What will its volume be at standard pressure?

List Givens	Formula	Givens plugged into Formula:
ANSWER WITH CORRECT UNITS & SIG FIGS:		

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13. A sample of sulfur dioxide occupies a volume at 625 mL at 40°C, 720 mmHg and there are 2.00 moles in the space. What is the final volume if the number of moles is increased to 5.5 moles, 50°C, and 650mmHg?

List Givens	Formula	Givens plugged into Formula:
ANSWER WITH CORRECT UNITS & SIG FIGS:		

14. A gas occupies 4.21 liters at a pressure of 75.0 kPa. What will its volume be if the pressure is decreased to 350 mm Hg?

List Givens	Formula	Givens plugged into Formula:
ANSWER WITH CORRECT UNITS & SIG FIGS:		

15. A mixture of gases containing methane, CH<sub>4</sub>, ethane, C<sub>2</sub>H<sub>6</sub>, and propane, C<sub>3</sub>H<sub>8</sub>, gases has a total pressure of 975 mmHg. If the partial pressures of CH<sub>4</sub> and C<sub>2</sub>H<sub>6</sub> are 235 mmHg and 450mmHg, respectively, what is the partial pressure of C<sub>3</sub>H<sub>8</sub>?

List Givens	Formula	Givens plugged into Formula:
ANSWER WITH CORRECT UNITS & SIG FIGS:		

16. When the pressure on a gas increases, what happens to the volume? \_\_\_\_\_

17. If the pressure on a gas is decreased by ¼. What happens to the volume? \_\_\_\_\_

18. When the temperature of a gas decreases, what happens to its volume? \_\_\_\_\_

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19. A gas has a temperature of 35°C and a volume of 250 mL. What will its temperature be if the volume is increased to 500 mL?

List Givens	Formula	Givens plugged into Formula:
ANSWER WITH CORRECT UNITS & SIG FIGS:		

20. A gas has its volume doubled. What will happen to its Kelvin temperature? \_\_\_\_\_

21. How many moles of nitrogen gas are in a 3.50 L contained sample at STP?

LIST GIVENS	FORMULA	GIVENS PLUGGED INTO FORMULA:
ANSWER WITH CORRECT UNITS:		

22. Gas sample #1 contains 2.3 moles of chlorine gas in a 3.5 liter balloon. At the same conditions, Sample #2 contains 1.2 moles of chlorine gas, what is the volume of the balloon that contains sample #2?

List Givens	Formula	Givens plugged into Formula:
ANSWER WITH CORRECT UNITS & SIG FIGS:		

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23. A soccer ball filled with air has an internal pressure of 1.85 atm and a volume of 1.95 liters. If the ball is exposed to conditions where the pressure is 2.60 atm and there is no change in temperature, what will be the new volume of the soccer ball?

LIST GIVENS	FORMULA	GIVENS PLUGGED INTO FORMULA:
ANSWER WITH CORRECT UNITS:		

24. Determine the volume occupied by 2.34 grams of CO<sub>2</sub> at STP.

List Givens	Formula	Givens plugged into Formula:
ANSWER WITH CORRECT UNITS & SIG FIGS:		

25. A breathing mixture used by deep-sea divers contains helium, oxygen, and carbon dioxide. What is the partial pressure of oxygen at 1.0 atm of total pressure, if P<sub>He</sub> is 0.43 atm and P<sub>CO<sub>2</sub></sub> is 0.05 atm?

List Givens	Formula	Givens plugged into Formula:
ANSWER WITH CORRECT UNITS & SIG FIGS:		