**Name:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Due Date:** \_\_\_\_\_\_\_\_\_**Period:** \_\_\_\_\_\_

**Unit 9 Gas Law Study Guide**

**On the test, you will be given the following information:**

1 atm = 760 mmHg = 101.3 kPa R = 

PV = nRT 0**°**C = 273 K

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| **Learning Targets**  Students will be able to: |
| 1. Sides of equal sign for direct and inverse proportional relationships? |
| 2. Give the mathematical relationship and meaning of direct and inverse relationships.  Directly proportional: inversely proportional: |
| 3. What causes gas pressure? |
| 4. Explain how air has pressure:  give units and instruments for measurement of air pressure: |
| 5. Give the variables we discussed in classes regarding gases (hint: there are 4) |
| 6. Apply Boyle’s Law to gas problems  \_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_ are \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ when \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_ are held constant.  If a gas at 25.0 °C occupies 3.60 liters at a pressure of 1.00 atm, what will be its volume at a pressure of 2.50 atm? |
| 7. Apply Dalton’s Law of Partial Pressures to Mixtures of Gases  Equation for Dalton’s Law:  Nitrogen (80 kPa), oxygen (21.0 kPa), carbon dioxide (0.03 kPa), and water vapor (2.0 kPa) are the usual atmospheric components. What is the total atmospheric pressure in kPa?  A mixture of oxygen, hydrogen and nitrogen gases exerts a total pressure of 278 kPa.  If the partial pressures of the oxygen and the hydrogen are 112 kPa and 101 kPa respectively, what would be the partial pressure exerted by the nitrogen. |
| 8. Use a thermometer to measure temperature (performed in lab) |
| 9. Relate and convert between the Celsius and Kelvin temperature scales.  To convert from C  To convert from K  20 degrees C = ?K  Why can’t we use Celsius temperatures in gas law calculations? (hint: word of the day comes into play here…) |
| 10. Use Charles’s Law to relate the volume of a gas to its temperature and apply to gas problems.  Volume and Temperature are \_\_\_\_\_\_\_\_\_\_\_\_\_\_ proportional.  A 7.0 liter balloon at room temperature (22oC) contains hydrogen gas. If the balloon is carried outside to where the temperature is –3.0oC, what volume will the balloon occupy? |
| 11. Use Gay-Lussac’s Law to relate the pressure of a gas to its temperature and apply to gas problems.  \_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_ are \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ when \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_ are held constant  A 20 L cylinder containing 6 atm of gas at 27 °C. What would the pressure of the gas be if the gas was heated to 77 °C? |
| 12. Use Avogadro’s Hypothesis to relate the volume and amount of a gas.  \_\_\_\_\_\_\_\_\_\_\_ is \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_ when \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_ are held constant  Equation:  312 L of chlorine gas at STP. What mass of fluorine gas would be present at the same volume, temperature and pressure? |
| 13. Combine gas relationships to construct and use the Combined Gas Law and Ideal Gas Law  Combined gas law:  A gas has a volume of 800.0 mL at minus 23.00 °C and 300.0 torr. What would the volume of the gas be at 227.0 °C and 600.0 torr of pressure?  Ideal gas Law:  An engineer pumps 5.00 mol of carbon monoxide gas into a cylinder that has a capacity of 20.0 L. What is the pressure in kPa of CO inside the cylinder at 25°C? |
| 14. Distinguish between real and ideal gases. |
| 15. Solve stoichiometric problems involving ideal gases (see 6, 10, 11, 13) |
| 16. Explain the motion of gases using kinetic molecular theory.  4 assumptions of KMT: |
| 17. Use kinetic molecular theory to explain the diffusion of gases. |