

Gas Laws Study Guide

Test Format:

- Multiple choice and problems

Items that will be provided for the test (read important notes at the bottom):

- Gas law equations*
- The value of R
- Pressure conversion factors

* I will provide the equations on the test. You are responsible for knowing which laws the equations describe (ex: I will give you $P_1 \times V_1 = P_2 \times V_2$ and you must know that this is Boyle's Law).

- 1) What is the name of the model we currently use to explain the behavior of gases? **kinetic molecular theory (KMT).**
- 2) Define the kinetic molecular theory (KMT). **Gases are in constant motion with elastic collisions**
- 3) The KMT makes many assumptions about the Size, motion, and energy of gas particles.
- 4) According to the KMT, do gas particles experience attractive or repulsive forces? Explain why or why not. **Neither- they are too far apart**
- 5) Completely describe the motion of gas particles according to the KMT. **Constant, Random, Straight paths, different velocity**
- 6) Define elastic collision. **No kinetic energy is lost- just transferred between particles**
- 7) What determines the kinetic energy of a particle? **Mass and velocity**
- 8) In a sample of a single gas, do all particles have the same kinetic energy? Explain why or why not. **No — they have a different velocity**
- 9) Define temperature. **Measurement of kinetic energy**
- 10) Explain why gases have a low density. **Lots of space between particles (large volume)**
- 11) Why are gases compressible? **Lots of empty space between particles**
- 12) Why do gases expand to fill a container? **No attractive or repulsive forces**
- 13) Why can gas particles flow easily past each other? **No attractive forces**
- 14) Define diffusion. **Movement of one material through another**
- 15) Define effusion. **Gas escapes through tiny openings**
- 16) Describe how diffusion depends on the mass of the particles. **Diffusion is dependent on mass, so less mass more diffusion**
- 17) Use the KMT to explain why a balloon expands as you blow air into it. **Particles are in constant motion and collide with their surroundings expanding the balloon**

Boyle's Law: Answer the following questions about Boyle's Law.

- 18) Describe Boyle's Law in your own words. **As pressure increases, volume decreases**
- 19) What is the formula? **$P_1V_1 = P_2V_2$**
- 20) What are the variables? What are the possible units used in the formula? **Pressure and volume, atm, kPa, mL, L**
- 21) What is constant? **temperature**



- 22) Give an example to help explain the law (you should have some type of visual of your example).
- 23) What would a graph of pressure vs. volume of a gas look like according to Boyle's Law?

Charles' Law: Answer the following questions about Charles' Law.

- 24) Describe Charles' Law in your own words. **Increase temperature, increase volume**
- 25) What is the formula? **=**
- 26) What are the variables? What are the possible units used in the formula? **Temperature and volume (kelvin, mL, L)**
- 27) What is constant? **Pressure**
- 28) What is very important to remember about the temperature variable when using this formula? **It must be in kelvin**
- 29) Give an example to help explain Charles's Law (you should have some type of visual of your example).



- 30) What would a graph of temperature vs. volume of a gas look like according to Charles's Law?

Gay-Lussac's Law: Answer the following questions about Gay-Lussac's Law.

- 31) Describe Gay-Lussac's Law in your own words. **As pressure increases, temperature increases**
- 32) What is the formula? **=**
- 33) What are the variables? What are the possible units used in the formula? **Pressure and temperature (kelvin, atm, kPa, torr)**
- 34) What is constant? **volume**
- 35) What is very important to remember about the temperature variable when using this formula? **It must be in kelvin**
- 36) Give an example to help explain Gay-Lussac's Law (you should have some type of visual of your example).

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A Gutmann



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