

REVIEW-Gases KEY

I. Kinetic Molecular Theory & Gas Laws Concepts

1. What are the five assumptions of kinetic molecular theory?

Gases are mostly empty space; in constant rapid motion; not repulsive or attractive forces; collisions between particles are elastic; kinetic energy is directly proportional to temperature

2. Convert the following pressure values:

$$2.45 \text{ atm} \rightarrow \text{Pa}$$

$$\mathbf{248,000 \text{ Pa}}$$

$$12,300 \text{ Pa} \rightarrow \text{torr}$$

$$\mathbf{92.3 \text{ torr}}$$

$$659 \text{ mmHg} \rightarrow \text{atm}$$

$$\mathbf{0.867 \text{ atm}}$$

$$805 \text{ torr} \rightarrow \text{mmHg}$$

$$\mathbf{805 \text{ mmHg}}$$

3. Convert the following Celsius temperatures to Kelvin:

a. $200. \text{ }^\circ\text{C}$

$$\mathbf{473 \text{ K}}$$

b. $27.0 \text{ }^\circ\text{C}$

$$\mathbf{300 \text{ K}}$$

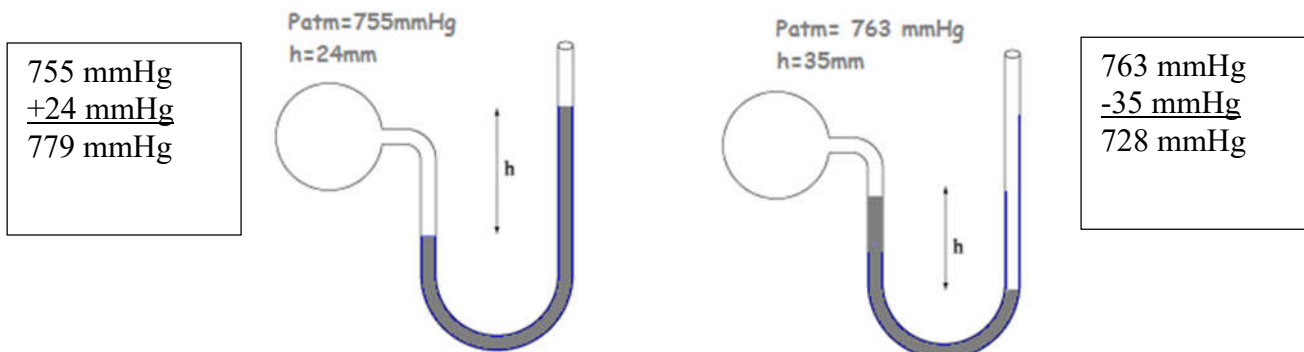
4. Explain how increasing the number of gas molecules in a container is related to collisions of gas molecules and pressure

As you add more particles, the number of collisions to the surface of the container will increase. Since pressure is due to the amount of collisions on the surface of a container, by increasing collisions you will also increase the pressure. Therefore, increasing particle number will increase pressure.

5. What is the relationship between pressure and altitude?

As you go higher in altitude the pressure decreases; an inverse relationship.

6. What is the name of the devices below? Determine the pressure for both.



Open manometer. Look at whether the liquid in the tube is higher on the side of the container or the open end of the tube. If it is closer to the open end, you add the atmospheric pressure to the height difference of the liquid in the tube. If it is closer to the container, you subtract the atmospheric pressure to the height difference of the liquid in the tube.

7. What is meant by STP? What are the values?

STP = Standard Temperature and Pressure

ST = 273 K

SP = 1.00 atm

8. What units does temperature have to be in in order to use the gas laws equations? What is the equation for this conversion?

Temperature must always be in Kelvin.

___ °C + 273.15 = _____ K

9. How do you know which gas constant, R, value to use in the ideal gas law?

Look at the unit for pressure

10. If two containers have the same volume of gas at STP, what do you know about the number of moles (and therefore molecules) of gas in the containers?

They are the same

11. Why does a balloon shrink in size when it is taken outside on a cold day?

The molecules slow down and this causes less collisions with the surface of the container and occupying less space.

12. Which Gas Law is involved when a balloon pops after being sat on?

a. Charles Law

b. **Boyle's Law**

c. Gay-Lussac's Law

d. Ideal Gas Law

13. As the volume of confined gas decreases at constant temperature, the pressure exerted by the gas _____.

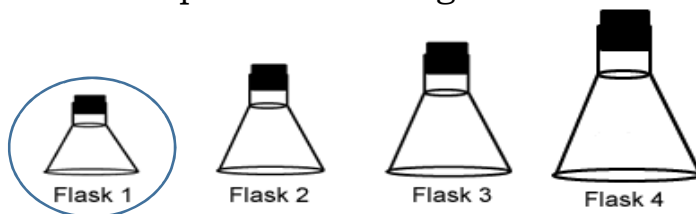
a. decreases

b. **increases**

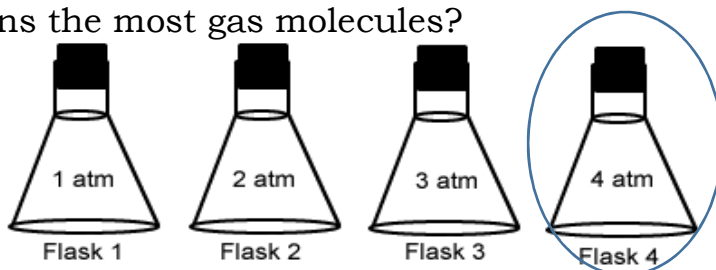
c. stay the same

d. fluctuates

14. Each of these flasks contains the same number of gas molecules. In which container is the pressure the highest?



15. Each of these flasks is the same size and at the same temperature. Which one contains the most gas molecules?



16. Assuming that the temperature remains constant. How can you increase the pressure of a gas?
- Increase the container volume
 - Add more molecules of the gas**
 - Decreases the container volume**
 - None of the above
17. Compare THE rates of effusion of oxygen gas to fluorine gas.
F₂ gas effuses slower than O₂ gas.
18. Rank the gases from lowest to highest speed: He, Kr, I₂, SO₂
I₂, Kr, SO₂, He