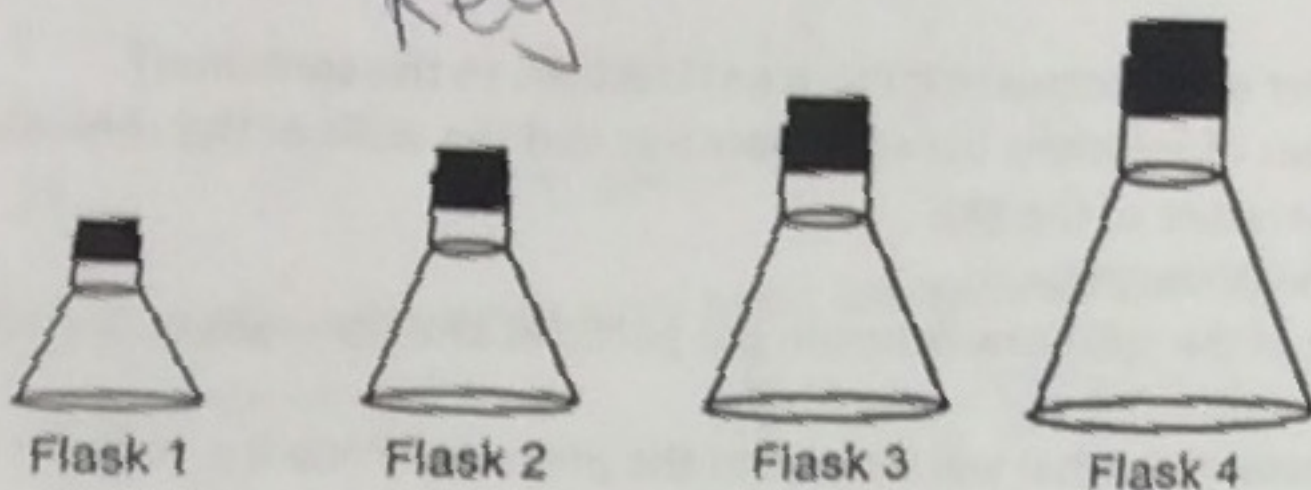


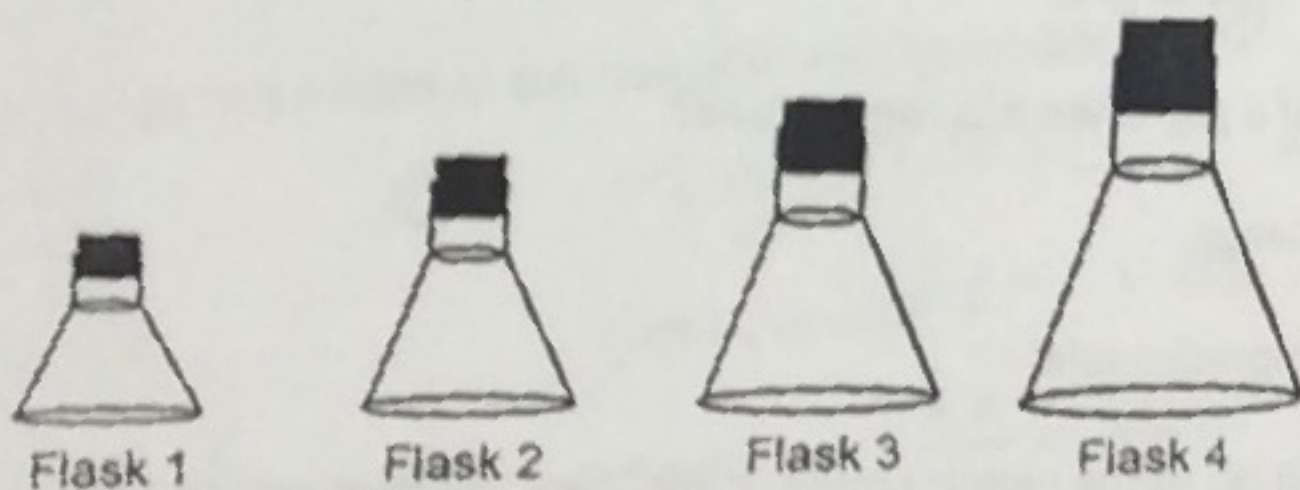
# Gas Laws Quiz Review

Name: \_\_\_\_\_

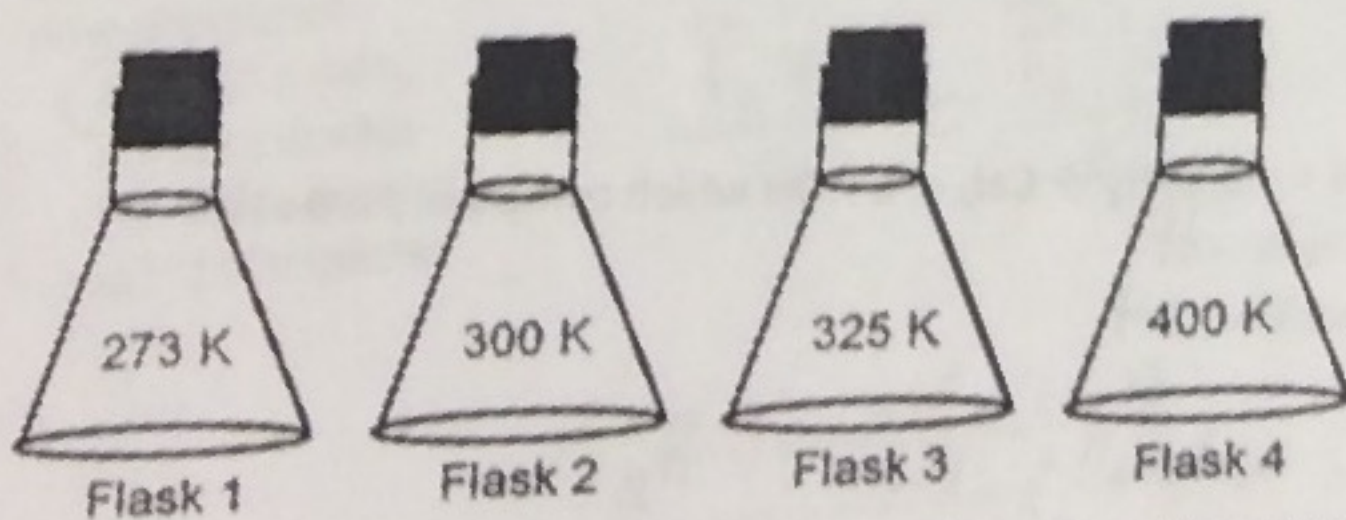
Key



1. Each of these flasks (above) contains an equal number of gas molecules and are at the same temperature. In which container is the pressure lowest?
- a. Flask 1
  - b. Flask 2
  - c. Flask 3
  - d. Flask 4 Has the most space for the same particles



2. Each of these flasks (above) contains an equal number of gas molecules and are at the same pressure. In which container is the temperature highest?
- a. Flask 1
  - b. Flask 2
  - c. Flask 3
  - d. Flask 4 to increase pressure temperature must increase.



3. Each of these flasks (above) contains an equal number of gas molecules. In which container is the pressure highest?
- a. Flask 1
  - b. Flask 2
  - c. Flask 3
  - d. Flask 4



4. Why does the pressure inside a container of gas increase if more gas is added to the container?
- There is an increase in the number of collisions between particles and the walls of the container.
  - There is an increase in the temperature of the gas.
  - There is a decrease in the volume of the gas.
  - There is an increase in the force of the collisions between the particles and the walls of the container.
5. If the volume of a container of gas is increased, what will happen to the pressure inside the container?
- The pressure will increase.
  - The pressure will not change.
  - The pressure will decrease.
  - The pressure depends on the type of gas.
6. If a water bottle is squeezed, what happens to the pressure of the gas inside?
- It increases.
  - It stays the same.
  - It decreases.
  - The pressure depends on the type of gas.
7. What happens to the temperature of a gas when it is compressed?
- The temperature increases.
  - The temperature does not change.
  - The temperature decreases.
  - The temperature becomes unpredictable.
8. Not all gas law problems have Kelvin (K) as the unit of temperature. They can be expressed in Celsius and Fahrenheit. Convert  $178^{\circ}\text{C}$  to K
- 424 K
  - 541 K
  - 451 K
  - 513 K
- $178 + 273 =$
9. What happens to litmus paper in acidic solutions?
- red litmus turns blue
  - blue litmus turns red
  - yellow litmus turns green
10. Given the neutralization reaction:  $2\text{HI} + \text{Ca}(\text{OH})_2 \rightarrow \text{CaI}_2 + 2\text{HOH}$  which compound is a salt?
- HI - acids start with H
  - $\text{Ca}(\text{OH})_2$  - Bases end with OH
  - $\text{CaI}_2$
  - HOH - acid and base, and really water  $\text{H}_2\text{O}$
11. An acid solution exactly neutralized a base solution according to the equation  $\text{acid} + \text{base} \rightarrow \text{salt} + \text{water}$ . If the neutralized mixture contained the salt  $\text{MgBr}$ , the pH of the aqueous mixture would be closest to
- 3
  - 7
  - 9
  - 11
- Neutralized means all  $\text{H}^+$  and  $\text{OH}^-$  bonded to become neutral.



12. In the reaction:  $\text{H}_3\text{PO}_4 + 3 \text{H}_2\text{O} \leftrightarrow 3 \text{H}_3\text{O}^+ + \text{PO}_4^{3-}$  The acids is

- a.  $\text{H}_3\text{PO}_4$
- b.  $\text{H}_2\text{O}$
- c.  $\text{H}_3\text{O}^+$
- d.  $\text{PO}_4^{3-}$

13. Given the reaction:  $\text{HF}(\text{g}) + \text{H}_2\text{O}(\text{l}) \rightarrow \text{H}_3\text{O}^+(\text{aq}) + \text{F}^-(\text{aq})$  Which reactant acted as a Brønsted-Lowry acid?

- a.  $\text{H}_2\text{O}(\text{l})$ , because it accepted protons
- b.  $\text{H}_2\text{O}(\text{l})$ , because it produced hydronium ions
- c.  $\text{HF}(\text{g})$ , because it reacted with chloride ions
- d.  $\text{HF}(\text{g})$ , because it donated protons

↓  
Something that  
donates protons  
Brønsted Lowry base - accept protons

14. How many milliliters of ~~0.115~~ <sup>0.115M</sup> M HCl are required to exactly neutralize 25.0 milliliters of 0.1380 M KOH?

- a. 30.0 mL
- b. 3.00 mL
- c. 20.8 mL
- d. 2.08 mL

$$M_a V_a = M_b V_b$$

$$\frac{(0.115M) V_a}{(0.115M)} = \frac{(0.138M)(25.0\text{mL})}{(0.115M)}$$

15. The concentration of NaOH is 0.5 M, if 20 mL is needed to titrate 25 mL of acid, what is the concentration of the acid?

- ~~a. 0.875 M~~
- ~~b. 0.0029 M~~
- ~~c. 0.29 M~~
- ~~d. 0.00875 M~~

$$M_a V_a = M_b V_b$$

$$M_a (25\text{mL}) = 0.5M (20\text{mL})$$

$$M_a = \frac{0.5M \times 20\text{mL}}{25\text{mL}}$$

$$M_a = 0.4M$$

16. A solution of a base differs from a solution of an acid in that the solution of a base

- a. has a greater  $[\text{H}_3\text{O}^+]$
- b. is able to conduct electricity
- c. has a greater  $[\text{OH}^-]$
- d. is able to cause an indicator color change

17. According to Arrhenius theory, which species does an base produce in aqueous solution?

- a. hydrogen ions
- b. sodium ions
- c. hydroxide ions
- d. chloride ions

Arrhenius - acid produces  $\text{H}^+$   
base produces  $\text{OH}^-$

18. Which pH change represents a tenfold increase in the concentration of  $\text{H}^+$ ?

- a. pH 3 to pH 1
- b. pH 5 to pH 7
- c. pH 4 to pH 3
- d. pH 13 to pH 14

change  
by 1  
number  
more acidic  
closer to one



19. Which pH indicates an acidic solution?

- a. 11
- b. 7
- c. 5
- d. 12

Acidic: 0 - 6.999  
Neutral: 7  
Basic: 7.1 - 14

20. As an aqueous solution becomes more basic, the hydroxide ion concentration

- a. remains the same
- b. decreases
- c. increases
- d. need more information

Bases produce  $\text{OH}^-$ , more basic more  $\text{OH}^-$

21. The pH of a 0.1 M HCl solution is closest to

- a. 1
- b. 3
- c. 7
- d. 10

$$-\log[0.1\text{M}] = 1$$

22. What is the pH of a 0.0095 M solution of lithium hydroxide (LiOH)?

- a. 2.02
- b. 4.50
- c. 9.50
- d. 11.98

$-\log[0.0095] = 2.02$ , but the concentration was a base so 2.02 is pOH.

$$\text{pH} = 14 - \text{pOH}$$
$$\text{pH} = 14 - 2.02$$

Use the combined gas law for the next two questions.

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

23. 6.0 L of gas exerts a pressure of 2.5 atm. When the pressure is increased to 10.0 atm, the gas volume is \_\_\_

- a. 1.0 L
- b. 1.5 L
- c. 1.7 L
- d. 25 L

No temp, so ignore  $T_1$  and  $T_2$

$$P_1 V_1 = P_2 V_2$$

$$2.5 \text{ atm}(6.0 \text{ L}) = 10 \text{ atm}(V_2)$$

$$V_2 = (2.5)(6.0) / 10$$

24. A sample of  $\text{N}_2$  gas occupies 0.50 L at 555 mmHg and 62 C. If its volume changes to 0.400 L at 122 C what is the new pressure?

- a. 818 mmHg
- b. 422 mmHg
- c. 0.763 mmHg
- d. 1320 mmHg

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

need to be K

$$\frac{(555 \text{ mmHg})(0.5 \text{ L})}{62 + 273} = \frac{P_2(0.400 \text{ L})}{122 + 273}$$

$$0.828 = P_2(0.00101)$$

$$P_2 = \frac{0.828}{0.00101}$$

$$P_2 =$$