

## Assignment Previewer

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## Chapter 12 (397937)

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## About this Assignment

## Description

Gases and their Properties

## Instructions

Gases and their Properties

1. KT6 12.P.006. [467473] [Show Details](#)

A sample of CO<sub>2</sub> gas has a pressure of 47.1 mm Hg in a 125 mL flask. The sample is transferred to a new flask, where it has a pressure of 56.5 mm Hg at the same temperature. What is the volume of the new flask?

   mL2. KT6 12.P.008. [467277] [Show Details](#)

A 5.4 mL sample of CO<sub>2</sub> gas is enclosed in a gas-tight syringe (see Figure 12.3) at 22°C. If the syringe is immersed in an ice bath (0°C), what is the new gas volume, assuming that the pressure is held constant?

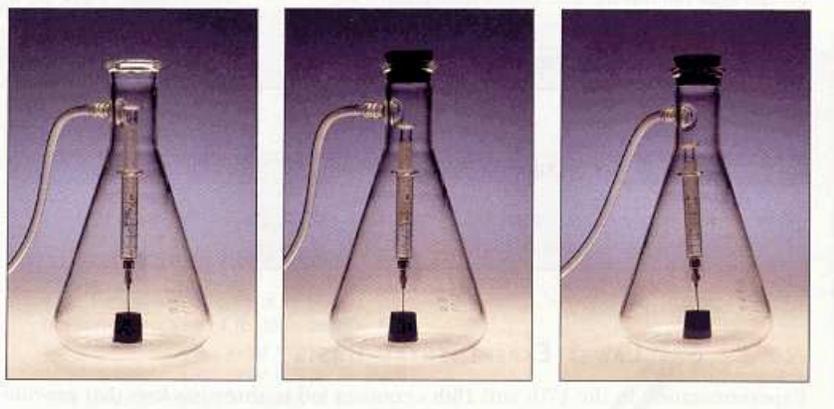
   mL

Figure 12.3

3. KT6 12.P.013. [467529] [Show Details](#)

One of the cylinders of an automobile engine has a volume of 400. cm<sup>3</sup>. The engine takes in air at a pressure of 1.00 atm and a temperature of 15°C and compresses the air to a volume of 45.4 cm<sup>3</sup> at 77°C. What is the final pressure of the gas in the cylinder? (The ratio of before and after volumes, in this case 400:50 or 8:1, is called the compression ratio.)

   atm4. KT6 12.P.016. [467348] [Show Details](#)

Ethane,  $C_2H_6$ , burns in air according to the following equation.



What volume of  $O_2$  (in L) is required for complete reaction with 4.7 L of  $C_2H_6$ ? Assume all gases are measured at the same temperature and pressure.

L

What volume of  $H_2O$  vapor (L) is produced?

L

5. KT6 12.P.024. [467241] [Show Details](#)

Diethyl ether,  $(C_2H_5)_2O$ , vaporizes easily at room temperature. If the vapor exerts a pressure of 215 mm Hg in a flask at 25°C, what is the density of the vapor?

g/L

6. KT6 12.P.030. [494976] [Show Details](#)

Acetaldehyde is a common liquid compound that vaporizes readily. Determine the molar mass of Acetaldehyde from the following data.

Sample mass = 0.107 g

Temperature = 0.0°C

Volume of gas = 125 mL

Pressure = 331 mm Hg

g/mol

7. KT6 12.P.032. [467182] [Show Details](#)

Silane,  $SiH_4$ , reacts with  $O_2$  to give silicon dioxide and water.

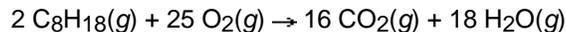


A 6.40 L sample of  $SiH_4$  gas at 356 mm Hg pressure and 25°C is allowed to react with  $O_2$  gas. What volume of  $O_2$  gas, in liters, is required for complete reaction if the oxygen has a pressure of 236 mm Hg at 25°C?

L

8. KT6 12.P.034. [467309] [Show Details](#)

The hydrocarbon octane ( $C_8H_{18}$ ) burns to give  $CO_2$  and water vapor.



If a 0.072 g sample of octane burns completely in  $O_2$ , what will be the pressure of water vapor in a 4.75 L flask at 30.0°C?

atm

If the  $O_2$  gas needed for complete combustion was contained in a 4.75 L flask at 26.0°C, what would its pressure be?

atm

9. KT6 12.P.040. [467456] [Show Details](#)

A collapsed balloon is filled with He to a volume of 15 L at a pressure of 1.0 atm. Oxygen ( $O_2$ ) is then added so that the final volume of the balloon is 24 L with a total pressure of 1.0 atm. The temperature, which remains constant throughout, is 20.°C.

(a) What mass of He does the balloon contain?

4.0   g

(b) What is the final partial pressure of He in the balloon?

4.0   atm

(c) What is the partial pressure of O<sub>2</sub> in the balloon?

4.0   atm

(d) What is the mole fraction of each gas?

$x_{\text{helium}}$

4.0

$x_{\text{oxygen}}$

4.0

10. KT6 12.P.050. [494973] [Show Details](#)

A sample of uranium fluoride is found to effuse at the rate of 17.7 mg/h. Under comparable conditions, gaseous I<sub>2</sub> effuses at the rate of 15.0 mg/h. What is the molar mass of the uranium fluoride? (*Hint*: Rates must be converted to units of moles per time.)

4.0   g/mol

11. KT6 12.P.063. [467578] [Show Details](#)

Ni(CO)<sub>4</sub> can be made by reacting finely divided nickel with gaseous CO. If you have CO in a 1.70 L flask at a pressure of 273 mm Hg at 25°C, along with 0.450 g of Ni powder, what is the theoretical yield of Ni(CO)<sub>4</sub>?

4.0   g

12. KT6 12.P.102. [467462] [Show Details](#)

Each of the four tires of a car is filled with a different gas. Each tire has the same volume and each is filled to the same pressure, 3.0 atm, at 25°C. One tire contains 120. g of air, another tire has 79.0 g of neon, another tire has 16.1 g of helium, and the fourth tire has 151. g of an unknown gas.

(a) Do all four tires contain the same number of gas molecules? If not, which one has the greatest number of molecules?

- tire with air
- tire with neon
- tire with helium
- tire with unknown gas
- all the same

(b) How many times heavier is a molecule of the unknown gas than an atom of helium?

×

(c) In which tire do the molecules have the largest kinetic energy?

- tire with air
- tire with neon
- tire with helium
- tire with unknown gas
- all the same

In which tire do the molecules have the greatest average speed?

- tire with air
- tire with neon
- tire with helium
- tire with unknown gas
- all the same

13. KT6 12.Tutor: Determining Molar Mass [510261] [Show Details](#)**Tutorial Question**

If you have trouble answering the main question(s) below, a tutorial will guide you through the solution process.

**Determining Molar Mass**

MAIN QUESTION

**Question**

A gas sample is found to have the following properties:

mass: 2.36 g  
 volume: 514 mL  
 temperature: 28.3 °C  
 pressure: 724 mmHg

What is the molar mass of the gas, in g/mol?

**Answer**

Enter a response, then Submit.

 g/mol

Submit

**APPROACH****Step 1**

Convert volume to units of L.

**Step 2**

Convert temperature to K.

**Step 3**

Convert pressure to units of atm.

pressure (mmHg)  $\cdot \frac{1 \text{ atm}}{760 \text{ mmHg}} = \text{pressure (atm)}$

**Step 4**

Calculate the amount of gas, in moles.

$$n = \frac{PV}{RT} \quad R = 0.08206 \text{ L}\cdot\text{atm}/\text{K}\cdot\text{mol}$$

**Step 5**

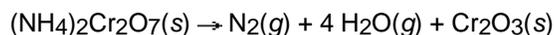
Calculate the molar mass.

$$\text{molar mass} = \frac{\text{g sample}}{\text{mol sample}}$$

Question has not been submitted for scoring.

14. KT6 12.P.070. [467335] [Show Details](#)

A miniature volcano can be made in the laboratory with ammonium dichromate. When ignited, it decomposes in a fiery display.



If 0.86 g of ammonium dichromate is used, and if the gases from this reaction are trapped in a 20. L flask at 23°C, what is the total pressure of the gas in the flask?

4.0   atm

What are the partial pressures of N<sub>2</sub> and H<sub>2</sub>O?

N<sub>2</sub>

4.0   atm

H<sub>2</sub>O

4.0   atm

[Submit for Testing](#)