

11.E: Exercises

11.5: Applications of the Ideal Gas Law: Molar Volume, Density and Molar Mass of a Gas

1. If 100 mL of HCl gas at 300 K and 100 kPa dissolves in 20 mL of pure water, what is the concentration?

Hint: 0.4 mol/L

Skill:

Calculate n using ideal gas law.

2. If 100 mL of HCl gas at 300 K and 100 kPa dissolved in pure water requires 12.50 mL of the NaOH solution to neutralize in a titration experiment, what is the concentration of the NaOH solution?

Hint: 0.32 mol/L

Skill:

Apply ideal gas law to solve stoichiometry problems.

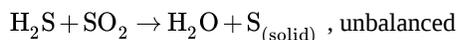
3. If 100 mL of HCl gas at 300 K and 200 kPa dissolved in pure water requires 12.50 mL of the NaOH solution to neutralize in a titration experiment, what is the concentration of the NaOH solution?

Hint: 0.64 mol/L

Skill:

Solve stoichiometric problem.

4. Hydrogen sulfide reacts with sulfur dioxide to give H₂O and S,



If 3.0 L of H₂S gas at 760 torr produced 4.8 g of sulfur, calculate the temperature in C.

Hint: 93 degrees C

Skill:

Apply ideal gas law to solve stoichiometry problems.

5. When 10.0 mL of AgNO₃ solution is treated with excess amount of HI gas to give 0.235 g of AgI, what is the concentration of the AgNO₃ solution?

Hint: 0.10 M

6. When an AgNO₃ solution is treated with 50.0 mL of HI gas to give 0.235 g of AgI, what is the concentration of the HI gas?

Hint: 0.020 mol/L

7. When an AgNO₃ solution is treated with 50.0 mL of HI gas at 300 K to give 0.235 g of AgI, what is the pressure of the HI gas?

Hint: 0.49 atm

Discussion:

Depending on the numerical values you use, you may get the pressure in other units.

8. When an AgNO₃ solution is treated with 50.0 mL of HI gas at 374 torr to give 0.235 g of AgI, what is the temperature of the HI gas?

Hint: 300 K

Discussion:

Note the relationship of this problem with the previous one.

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