Molar Volume at STP

New Regents original practice • Name: _____ Date: _____
Show your work for written answers.

At STP, one mole of an ideal gas occupies 22.4 L in the model given in the 2025 Chemistry Reference Tables.

1 What volume does 0.500 mol of an ideal gas occupy at STP?

(1) 5.60 L

(2) 11.2 L

(3) 22.4 L

(4) 44.8 L

2 How many moles of ideal gas occupy 33.6 L at STP? Show your conversion. [1]

Answer and work

3 Which pair of conditions is STP according to the 2025 tables?

(1) 0.00 K and 1.00 atm

(2) 273.15 K and 1.00 atm

(3) 273.15 K and 2.00 atm

(4) 298.15 K and 1.00 atm

4 One mole of helium and one mole of neon occupy the same volume at STP in the ideal model. Explain why their masses still differ. [1]

Answer and work

Comparing Gas Samples

Use the information below to answer the questions.

A model compares three ideal-gas samples at 273.15 K. Use both the measured volume and the listed pressure before applying the STP relationship.

Sample	Gas	Volume (L)	Pressure (atm)
A	Neon	11.2	1.00
B	Helium	44.8	1.00
C	Neon	11.2	2.00

5 Which samples are at STP?

(1) A and B

(2) A and C

(3) B and C

(4) A, B, and C

6 Calculate the amount of gas in each of A and B. Include units. [1]

Answer and work

7 A student assigns the same amount of gas to A and C because both volumes are 11.2 L. Use the pressures to explain why that conclusion is incorrect. [1]

Answer and work

8 If sample C is allowed to reach 1.00 atm at the same temperature and amount of gas, what volume will it occupy?

(1) 5.60 L

(2) 11.2 L

(3) 16.8 L

(4) 22.4 L