

Gas Laws: Combined Gas Laws

1. A 15.0 L sample of an ideal gas has its temperature doubled and its pressure tripled. The volume of the gas under these new conditions will be ____ L

a	10.0
b	22.5
c	2.50
d	45.0

2. A sample of an ideal gas is kept at a constant temperature. If the gas has an initial volume of 100 L at a pressure of 76.0 torr, then with a new pressure of ____ torr the gas will occupy a volume of 85.0 L

a	112
b	98.4
c	89.4
d	64.6

3. A sample of an ideal gas is kept at a constant pressure. At a temperature of 300 K, the volume of the gas is 4.60 L. With an increase of 5.00 K the new volume of the gas will be ____ L

a	4.52
b	0.0767
c	276
d	4.68

4. A gas filled balloon contracts when it is cooled by liquid nitrogen at its boiling point of -196°C . To what fraction of its original volume will the balloon shrink when it is cooled from a room temperature of 20°C ? Assume a constant pressure.

- a. 0.569
- b. 3.81
- c. -9.80
- d. 0.263

5. Numerical response question

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Left justify your answer in the boxes provided.

Doubling the Celsius temperature of a fixed amount of gas at a fixed pressure does NOT cause the gas volume to double.

Find the percentage increase of volume when the temperature of an ideal gas changes from 30.00°C to 60.00°C . Round the answer to the nearest hundredth.

6. **Numerical response question**

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Left justify your answer in the boxes provided.

Callena is alone in the chemistry lab where she decomposes 0.28 mL of nitrogen dioxide into its elements. The volume of nitrogen formed is _____ mL. Assume constant conditions of temperature and pressure.

7. **Numerical response question**

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Left justify your answer in the boxes provided.

The volume of a sealed helium balloon triples at constant temperature. The pressure inside the balloon _____ by a ratio of _____.

Choose from the list of possible answers given below:

1. Increases
2. Decreases
3. Remains constant
4. 1:3
5. 3:1
6. 3:3

8. **Numerical response question**

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Left justify your answer in the boxes provided.

Charles' Law states: as the temperature of a gas increases, the volume increases, assuming the pressure is kept constant. If you have 500 mL of acetylene ($C_2H_{2(g)}$) at 300 K, then you would have 0.750 L at _____ K. Assume the pressure is constant.

9. **Numerical response question**

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Left justify your answer in the boxes provided.

Leon and Jordyn are filling balloons with 2.00 L of helium at Leon's house which is kept at a comfortable 21.0 °C. They move the balloons outside for Leon's Grandma's birthday party. If the temperature outside drops to 12.0 °C, then the new volume will be _____ L. Assume the pressure remains constant.

10. **Numerical response question**

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Left justify your answer in the boxes provided.

The average person inhales and exhales about 0.50 L of air per breath. Alana exhales 0.50 L of air at 37 °C with a pressure of 107 kPa. The volume this gas will occupy at SATP will be _____ L. Round to the nearest hundredth.

11. **Numerical response question**

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Left justify your answer in the boxes provided.

Laramie releases a weather balloon that holds 60.0 L of nitrogen gas at SATP. As the balloon rises, the volume expands to 95.0 L and the temperature drops to 233K. The new pressure of the balloon will be _____ mm of mercury.

12. **Numerical response question**

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Left justify your answer in the boxes provided.

What is the new volume of a 1.50 L sample of ideal gas if it goes from conditions of 105 kPa and 280K to a condition of 130 kPa and 250K? Express the answer in litres.

13. **Numerical response question**

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Left justify your answer in the boxes provided.

Find the new pressure if a 75.0 mL sample of nitrogen gas at SATP goes to a volume of 80.0 mL at a temperature of 310 K. Express the answer as _____ kPa.

Answers:

1. A
2. C
3. D
4. D
5. 9.90
6. 0.14
7. 24
8. 450
9. 1.94
10. 0.51
11. 49.4
12. 1.08
13. 97