

Problem of the Day 2

1. Atmospheric pressure on top of Mt. Everest is approximately 260 torr. Convert this pressure to atmospheres. You must show your work.

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2. A sample of gas has a volume of 4.25 L at 25.6 °C and a pressure of 748 mmHg. What is the volume of the gas if the temperature is raised to 26.8 °C and the pressure is lowered to 742 mmHg?

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3. Modern airbags in your car work by setting off the contact explosive sodium azide, $\text{NaN}_3(\text{s})$. The sodium azide decomposes into sodium metal and nitrogen gas.

(a) Write the balanced chemical equation for this decomposition reaction

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(b) How many moles of nitrogen gas are formed from the decomposition of 130.0 g of sodium azide?

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(c) Assume that $\text{N}_{2(\text{g})}$ behaves as an ideal gas and that the sodium azide and sodium metal do not have a significant volume. Calculate the pressure in the air bag when its volume is 20.0L and its temperature is 22.0 °C

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4. What volume, in liters, does 1.54 g N₂ occupy at 25 °C and 745 torr?

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5. A gas at 295 K and 0.987 atm has a density of 1.13 g L⁻¹. What is its molar mass?

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