

### Exercise 1.48 – Charles' law

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**Q1408-01** A 250 cm<sup>3</sup> sample of chlorine gas is prepared and collected at 60°C. Assuming the pressure remains constant, what would be the volume of the chlorine at standard temperature?

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**Q1408-02** Calculate the temperature in degrees Celsius at which 22.4dm<sup>3</sup> of gas at STP will occupy 30dm<sup>3</sup> (constant pressure).

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**Q1408-03** A sample of oxygen gas has a volume of 2.8 dm<sup>3</sup> at 21°C. At what temperature in Celsius would the gas have a volume of 5.6 dm<sup>3</sup>?

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**Q1408-04** A 10 cm<sup>3</sup> sample of a gas in a syringe at 25°C is heated to 100°C in an oven. The syringe's plunger is allowed to move outward against a constant atmospheric pressure. Calculate the new volume of the hot gas.

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**Q1408-05** A sample of radon gas has a volume of 100 dm<sup>3</sup> at 25°C. At what temperature would the gas occupy 500 dm<sup>3</sup>? Assume pressure is constant.

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**Q1408-06** What would the final volume of 3.0 dm<sup>3</sup> of nitrogen gas at 400 K be when it is cooled to 200 K under the same pressure conditions?

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**Q1408-07** A sample of nitrogen is collected in a 5.00 x 10<sup>2</sup> cm<sup>3</sup> bottle at a temperature of 22°C. Assuming the pressure remains the same, what volume would the gas occupy at 80°C?

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**Q1408-08** A sample of gas whose volume at 27°C is 0.127 dm<sup>3</sup>, is heated at constant pressure until its volume becomes 317 cm<sup>3</sup>. What is the final temperature of the gas in degrees Celsius?

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**Q1408-09** Determine the final volume of 20 dm<sup>3</sup> of a gas whose temperature changes from -173°C to 327°C at constant pressure.

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**Q1408-10** A weather balloon contains 3.4 X 10<sup>3</sup> m<sup>3</sup> of helium gas at 20°C. The afternoon sun heats this gas to 37°C. What is the volume of the balloon if atmospheric pressure remains constant?

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