Answer on Question #66232, Chemistry, General Chemistry

Charles's Law:
According to Charles's law, for a fixed quantity of gas at constant pressure, which of the given quantities is constant?
A: VT
B: V×T
C: V+T

Solution:

Charles's Law:
For a fixed mass of gas at constant pressure, the volume is directly proportional to the kelvin temperature.
That means, for example, that if you double the kelvin temperature from, say to 300 K to 600 K, at constant pressure, the volume of a fixed mass of the gas will double as well.
You can express this mathematically as:
V = constant x T

Charles' Law demands, that pressure is constant as well.
If you rearrange the pV = nRT equation by dividing both sides by p, you will get
V = nR/p x T
But everything in the nR/p part of this is constant.
That means, that V = constant x T, which is Charles' Law.
So, the right answer is $\frac{V}{T}$ = const.

Answer: no one.

Part B
A balloon was filled to a volume of 2.50 L, when the temperature was 30.0∘C. What would the volume become, if the temperature dropped to 11.0∘C.
Express your answer with the appropriate units.

Solution:

Data:	**Solution:**
$t_1 = 30.0\ ^0C$ $V_1 = 2.50$ L $t_2 = 11.0\ ^0C$	According to Charles's law, for a fixed mass of gas at constant pressure, the volume is directly proportional to the kelvin temperature. Thus: $\frac{V_1}{T_1} = \frac{V_2}{T_2}$ (1)

	$T_1 = 273 + 30.0 = 303.0$ (K) $T_2 = 273 + 11.0 = 284.0$ (K) From the first equation we can determine the value of V_2: $V_2 = \frac{V_1 \cdot T_2}{T_1} = \frac{2.50 \cdot 284.0}{303.0} = 2.34$ (L)
Find: V_2 = ?	**Answer:** V_2 = 2.34 L.

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