Chapter 5 – Problems 12

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12. A sealed tank at room temperature, 25[°C], has 22[g] of CO_2. The gas has a pressure of 732[mmHg]. The tank is moved to a room kept at 12[°C] and an additional 10[g] of CO_2 are added to the tank. What is the pressure in the tank? Assume no loss of gas when more CO_2 is added. (1)

$$\begin{aligned} 732[\text{mmHg}] &= .963[\text{atm}] \\ 22[\text{g}_{CO_2}] &= .5[\text{mol}_{CO_2}] \\ V &= \frac{.5 \cdot .0821 \cdot 298}{.963} \\ &= 12.7[\text{L}] \\ 32[\text{g}_{CO_2}] &= .727[\text{mol}_{CO_2}] \\ P &= \frac{.727 \cdot .0821 \cdot 285}{12.7} \\ &= 1.34[\text{atm}] \end{aligned} \tag{1}$$