

Answer to Question #72392, Physics / Mechanics | Relativity

Given,

$$T_1 = T_0 \quad n_1 = 2$$

$$T_2 = 2T_0 \quad n_2 = 4$$

Let the volume of the gases are V and mixed at a container with same volume V .

I have assumed the volume because without knowing the information about volume this problem can't be solved.

$$\text{So, } V_1 = V_2 = V$$

Now, their pressure before mixing are -

$$P_1 = \frac{n_1 R T_1}{V_1}$$

$$P_2 = \frac{n_2 R T_2}{V_2}$$

After mixing ,

$$n = n_1 + n_2$$

Now , from the Daltons law of partial pressure

$$\text{Net pressure } P = P_1 + P_2$$

$$= \frac{n_1 R T_1}{V_1} + \frac{n_2 R T_2}{V_2}$$

Let after mixing the temperature become T

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Now ,

$$\begin{aligned} T &= \frac{PV}{nR} \\ &= \frac{(\frac{n_1 R T_1}{V_1} + \frac{n_2 R T_2}{V_2})V}{nR} \\ &= \frac{(\frac{2 R T_0}{V} + \frac{4 R T_0}{V})V}{6R} \end{aligned}$$

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