Answer on Question #54592, Physics / Molecular Physics | Thermodynamics

Two closed containers of equal volume filled with air at pressure P and temperature T. Both are connected by a narrow tube. If one of the container is maintained at temperature T and other at temperature T', then new pressure in the container ...

Solution:

The ideal gas equation:

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$$

In our case:

$$\frac{PV}{T} + \frac{PV}{T} = \frac{P'V}{T} + \frac{P'V}{T'}$$

Thus,

$$\frac{P(2V)}{T} = P'V\left(\frac{1}{T} + \frac{1}{T'}\right)$$

So,

$$P' = \frac{2P}{T}\frac{1}{\left(\frac{1}{T} + \frac{1}{T'}\right)} = \frac{2P}{1 + \frac{T}{T'}}$$

Answer:

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