Answer on Question #73759, Physics / Molecular Physics | Thermodynamics

Question. When the pressure of a fixed mass of gas is increased to 5 atmospheric pressure the temperature increases from $-70°C$ to $130°C$. What is the ratio of the initial pressure.

Given.

$p_{fin} = 5\ atm = 506625\ Pa; T_{in} = -70° = 203\ K; T_{fin} = 130°C = 403\ K.$

Find.

$p_{in} - ?.$

Solution.

If $V = const$ ($V_{in} = V_{fin}$) then

$$\frac{p_{in}V_{in}}{T_{in}} = \frac{p_{fin}V_{fin}}{T_{fin}} \rightarrow p_{in} = \frac{p_{fin}V_{fin}T_{in}}{V_{in}T_{fin}} = \frac{p_{fin}T_{in}}{T_{fin}} = \frac{506625 \cdot 203}{403} = 255198\ Pa$$

Answer. $p_{in} = 255198\ Pa.$