Question #35559

A closed Vessel contains air at a temperature 30 C and a pressure of one

atm. it is heated to 150 C. What will be the new pressure??

Solution:

Let:

$t_1 = 30$ ℃

$t_2 = 150$ ℃

$P_1 = 1\ atm$

$P_2 = ?$

According to the Gay Lussac's law (isochoric process)

$$\frac{\boldsymbol{P_1}}{\boldsymbol{T_1}} = \frac{\boldsymbol{P_2}}{\boldsymbol{T_2}}$$

$\boldsymbol{P_2 = P_1 \frac{T_2}{T_1}}$ were $T_1 = t_1 + 273\ K$, $T_2 = t_2 + 273\ K$, K- Kelvin

$T_1 = 30 + 273 = 303\ K$

$T_2 = 150 + 273 = 423\ K$

$$\boldsymbol{P_2 = 1 * \frac{423}{303} = 1.4\ atm.}$$

Answer: 1.4 atm.