Answer on Question#40067 – Physics – Molecular Physics | Thermodynamics

A gas occupies a certain volume at 27 degree celcius. If it is heated at constant pressure, its volume is exactly doubled at a temperature

Solution:
$T_1 = 300K$ − initial temperature of a gas
We can use the combined gas equation ($P = const$):

$$\frac{PV_1}{T_1} = \frac{PV_2}{T_2} \quad (1)$$

$$V_2 = 2 \cdot V_1 \quad (2)$$

$$(2)in(1):$$

$$\frac{P_1V_1}{T_1} = \frac{P_2(2 \cdot V_1)}{T_2}$$

$$\frac{P_1V_1}{T_1} = \frac{P_1(2 \cdot V_1)}{T_2}$$

$$\frac{V_1}{T_1} = \frac{2 \cdot V_1}{T_2}$$

$$T_2 = 2T_1 = 2 \cdot 300K = 600K$$

Answer: volume of the gas is exactly doubled at a temperature 600K.