**Example(3):** The pressure of a gas at $27℃$ is $760 mmHg$. What is the pressure of the gas at 87℃ at constant volume?

**Solution:** **:**

| **Initial state** | **Final state** |
| --- | --- |
| $P_1 = 760\ mmHg$ | $P_2 =$ ? |
| $T_1 =$ 27℃ + 273$= 300\ K$ | $T_2 =$ 87℃ + 273 = $360\ K$ |

Using Gay–Lussac's Law, $\frac{P_1}{T_1} = \frac{P_2}{T_2}$

$$P_2 = \frac{P_1 T_2}{T_1} = \frac{760\ mmHg \times\ 360\ K}{300\ K} = \mathbf{912\ \ mmHg}$$

**Check:** The increase in temperature increases the pressure. So, the answer is reasonable.