

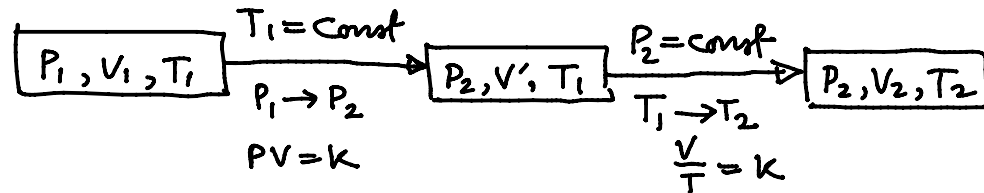
GAY-LUSSAC'S LAW:

At constant volume, the pressure of a given mass of gas is directly proportional to its absolute temperature.

$$\text{if } V = \text{const} , \quad P \propto T \quad \Rightarrow \quad P = kT$$

$$\boxed{\frac{P}{T} = k} \quad \text{--- (3)}$$

Universal Gas Law:



$$P_1 V_1 = k , \quad P_2 V' = k \quad \Rightarrow \quad P_1 V_1 = P_2 V'$$

$$V' = \frac{P_1 V_1}{P_2} \quad \text{--- (4)}$$

$$\frac{V'}{T_1} = \frac{V_2}{T_2} \quad \Rightarrow \quad V' = \frac{V_2 T_1}{T_2} \quad \text{--- (5)}$$

$$\text{by Eq (4) \& (5)} \quad \frac{P_1 V_1}{P_2} = \frac{V_2 T_1}{T_2} \quad \Rightarrow \quad \boxed{\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}} \quad \text{--- (6)}$$