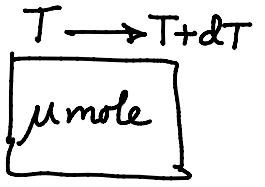
Mayer's Relation : $\boxed{C_p - C_V = R}$



In Isochoric Process (V=const)

$$(dQ)_V = \mu C_V \cdot dT \quad \text{—(7)}$$

$\because$ V=const. $\quad dW_V = 0$

So, by 1st Law $\quad (dQ)_V = dU_V + dW_V$

$$\mu C_V dT = dU_V + 0 \quad \text{—(8)}$$

In Isobaric Process (p=const.)

$$(dQ)_p = \mu C_p dT \quad \text{—(9)}$$

$\because$ p=const $\Rightarrow$ $dW = p \cdot dV$ —(10)

$$dU_p = dU_V \quad \text{—(11)}$$

Acc. to Ist Law of thermodynamics

$$(dQ)_p = dU_p + dW_p$$

$$\mu C_p dT = dU_V + p dV$$