* Isochoric Process:—

If the working substance is taken in a non-expanding chamber, the heat supplied will increase the pressure and temperature. The volume of substance will remain constant. Such a process is called an isochoric process. The work done is zero because there is no change in volume. The whole of the heat supplied increases the internal energy. Therefore, during the isochoric process $\delta W = 0$

$$\therefore \delta H = dU \quad \text{— (i)}$$

The heat transferred in such a process

$$\delta H = C_v \, dT$$

$$C_v \, dT = dU \quad \text{— (ii)}$$

Hence C_v is the specific heat for one gram molecule of a gas at constant volume.

* Isobaric Process:—

If the working substance is taken in an expanding chamber kept at a constant pressure, the process is called isobaric process. Here, the temperature and volume are change. If an amount of heat δH is given to the working substance, it is partly used in increasing the temperature of the working substance by dT and partly used in doing external work. Considering one gram of the working substance,

$$\delta H = 1 \times C_v dT + \frac{P \cdot dV}{J} \quad \text{— (i)}$$

But $\delta H = C_p \cdot dT$ — (ii)

$P \cdot dV = R \cdot dT$ —

$$\therefore C_p \cdot dT = C_v \cdot dT + \frac{R_r \cdot dT}{J}$$

$$\Rightarrow C_p \cdot dT - C_v \, dT = \frac{R_r \cdot dT}{J}$$

$$\Rightarrow (C_p - C_v) \cdot dT = \frac{R_r \cdot dT}{J}$$

$$\therefore C_p - C_v = \frac{R_r}{J} \quad \text{— (iii)}$$

Here C_p and C_v represents the specific heat of one gram of a gas and R_r is the ordinary gas constant.

If C_p and C_v are the gram molecular specific heats of gas, then

$$C_p - C_v = \frac{R}{J} \quad \text{— (iv)}$$

Here R is the universal gas constant