

First law of thermodynamics.

(6)

The energy can neither be created nor destroyed, it can be transformed from one form to another.
Also kta law of conservation of energy.

State & path functions.

The property of a thermodynamic system which has a definite value for a particular state of the system. It is independent of the manner in which the state is reached. Depends only on initial & final states of the system.

e.g. Pressure, temperature, volume & energy.

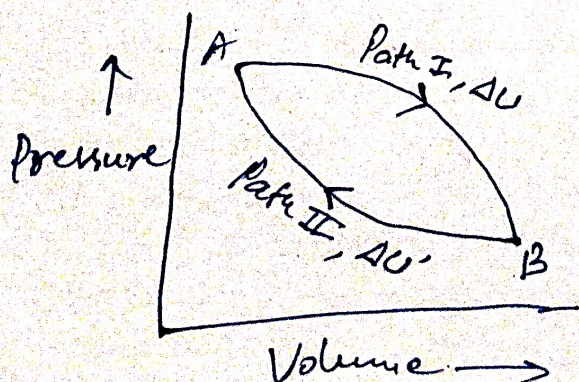
$$\int_{U_1}^{U_2} dU = U_2 - U_1 \quad (\text{Exact differentials})$$

The property of a thermodynamic system which depends on the path by which state of the system changes are called path functions.

e.g. Work & Heat

$$\int_{q_1}^{q_2} dq \neq q_2 - q_1$$

$$\int_{w_1}^{w_2} dw \neq w_2 - w_1 \quad (\text{Inexact differentials})$$



$A \rightarrow B$ (by path I) & $B \rightarrow A$ (path II)

Since, internal energy is a state function

$$\therefore \Delta U_{(\text{Path I})} = \Delta U_{(\text{Path II})}$$