

ΔQ is the heat flow to a system
 ΔW is the work-done by the system
and ΔU is the increase in internal
energy of the system and all the
energies are taken in the same
unit, namely, either joule, or calorie.
then

$$\Delta Q = \Delta U + \Delta W \quad \text{--- (1)}$$

our system undergoes an infinitesimal
change in state only an infinitesimal
amount of heat dQ is absorbed and
only an infinitesimal amount of work
 dW is done, so that the thermal
energy change dU is also infinitesimal,
we can write it as follows: -

$$dQ = dU + dW \quad \text{--- (2)}$$

This is the differential form of
the first law of thermodynamics.
In third form it is stated as
follows: - Perpetual motion of the
first kind is impossible.