Heat and Thermodynamics **Part-I, B.Sc and Subsidiary**

Maxwell's **Group-A Paper-I**

Maxwell's relations can be deduced by making use of the first and second law of thermodynamics.

First Law

If a substance absorbs a very small amount of heat dQ at a constant pressure, then part of this heat is used up to raise the temperature which results in the increase of internal energy dU. The rest of the heat is used in doing work in allowing the substance to increase in volume by an amount dV against the external pressure P.

Thus, according to the first law, we have

$$dQ = dU + PdV$$

or $$dU = dQ - PdV \text{ ---------- (i)}$$

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