Pure Substance → A pure substance is a substance which is

i) homogeneous in composition
ii) homogeneous in chemical aggregation
iii) Invariable in chemical aggregation

The chemical elements must be combined chemically in same way everywhere

The state of chemical combination of the system does not change with time

Saturation Pressure → It is the pressure at which phase change will occur for a given temperature.

Saturation Temperature → It is the temperature at which phase change will occur for a given pressure.

Ideal Gas Law →

$$PV = nR_uT$$

where,
P = Pressure ; V = Volume
n = No. of moles ; T = Temperature
R_u = Universal gas constant = 8.314 kJ/k-mol·K → Constant

It can also be written as

$$PV = \frac{m}{M} R_uT$$

where, $n = \frac{m}{M} = \frac{\text{Mass}}{\text{Molecular mass}}$

$$PV = m \cdot \frac{R_u}{M} T$$

$$PV = mRT$$

where,
R = Characteristics Gas Constant → Depends upon the molecular mass of ideal gases

~~Boyle's law~~

Law's of Ideal gas equation →

1) **Boyle's law** → $P \propto \frac{1}{V}$ (for a given mass)

if T = Constant

$$P_1 \propto \frac{1}{V_1}$$

$$\boxed{P_1 V_1 = P_2 V_2}$$

2) **Charle's Law** → $V \propto T$ (for a given mass)

if P = Constant

$$\boxed{\frac{V_1}{T_1} = \frac{V_2}{T_2}}$$

3) **Gay Lussac's law** → $P \propto T$ (for a given mass)

if V = Constant

$$\boxed{\frac{P_1}{T_1} = \frac{P_2}{T_2}}$$

4) **Avogadro's law** → $V \propto n$ (for a given mass of ideal gas)

if P & T are constant

5) **Regnoult's Law** → The specific heat at constant pressure (C_p) & specific heat at constant volume (C_v) do not change with change in pressure and temperature.

6) **Joule's law** → This law states that 'The internal energy of a given quantity of a gas depends on the temperature.

$U \propto T$ $U = f(T)$