

#73138

• How to derive ideal gas law using charle's & Boyle's law?

Sol. ÷ Ideal gas equation,

$$V \propto \frac{1}{P} \quad (\text{Boyle's law}) \quad \text{--- (i)}$$

$$V \propto T \quad (\text{charle's law}) \quad \text{--- (ii)}$$

$$V \propto n \quad (\text{Avogadro's Law}) \quad \text{--- (iii)}$$

Combining (i), (ii) & (iii)

$$V \propto \frac{nT}{P}$$

$$PV \propto nT$$

$$\boxed{PV = nRT}$$

Where, $R =$ universal gas constant

$$R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$$

when 'P' (Pressure) is in 'Pa' or N/m^2 &

'V' in m^3

$$\& R = 0.0821 \text{ atm lit/mol} \cdot \text{K}$$

$$\& R = 1.987 \text{ cal/mol K}^{-1}$$