

$$1 \text{ atm} = 760 \text{ torr}$$

$$= 1,325 \text{ Pa}$$

## Universal Gas Law

- Since the mass of a substance is directly related to the number of molecules present, we can reformulate the combined gas law to include the number of particles

$$\frac{PV}{nT} = R \quad (\text{Temp in K})$$

Avogadro's Law - Adding more gas molecules at a constant temperature & pressure will increase the volume proportionately

$$V = m^3$$

$n$  - Number of particles measured in moles

$R$  - Universal gas constant  $8.315 \frac{\text{J}}{\text{mol K}}$

$P$  - Pressure in Pascals

$$PV = nRT$$

Ex. How many moles of  $\text{H}_2$  is in a  $3.1 \text{ m}^3$  sample of  $\text{H}_2$  measured at  $300 \text{ Pa}$  and  $20^\circ\text{C}$

$$P = 300 \text{ Pa} \quad V = 3.1 \text{ m}^3 \quad T = 20^\circ\text{C} \text{ or } 293\text{K} \quad R = 8.31 \frac{\text{J}}{\text{mol K}}$$

$$PV = nRT$$

$$300 \text{ Pa} (3.1 \text{ m}^3) = n (8.31 \frac{\text{J}}{\text{mol K}}) (293 \text{ K})$$

$$n = 0.38 \text{ mol}$$