# 1 Kinetic Theory of Gases

**Basic Definitions**

| Quantity | Equation | Units |
|---|---|---|
| $N_A (Avogadro's number)$ | $$6.02 \times 10^{23}$$ | $mol^{-1}$ |
| Mole | $$M = mN_A$$ | mol |
| Number of moles | $$n = \frac{N}{N_A} = \frac{Msam}{M} = \frac{Msam}{mN_A}$$ | mol |
| Ideal Gas Law | $$pV = nRT$$ | |
| Boltzmann constants' Ideal Gas Law | $$pV = NkT$$ | |
| k (Boltzmann constant) | $$P = \frac{R}{N_A} = 1.38 \times 10^{-23}$$ | $J/K$ |
| Slow Adiabatic Volume Change | $$pV^\gamma = a\ constant$$ $$\gamma = \frac{C_p}{C_V}$$ | |
| Free Expansion | $$pV = a\ constant.$$ | |

**Applications**

| Name | Equation |
|---|---|
| Work done by an Ideal Gas | $$W = nRT \ln \frac{V_f}{V_i}$$ |