Formula Sheet:

$V \propto \frac{1}{P}$

$V \alpha n$

$V \alpha T$

$P_{total} = P_1 + P_2 + ...$

$PV = nRT$

$\left(P + \frac{n^2 a}{V^2}\right) \cdot (V - nb) = nRT$

$q = s\, m\, \Delta T$

$q = C_p\, \Delta T$

$\Delta H = q_p = \Delta E + P\Delta V$

$E = mc^2$

$t_{½} = (\ln 2) / k$

$\ln\left(\frac{N}{N_0}\right) = -kt$

$E = h\nu\ (= hf)$

$c = \lambda\nu\ (= \lambda f)$

$\overline{E}_k = \frac{1}{2} m \overline{u}^2$

$\lambda = \frac{h}{mv}$ (v = velocity)

$\Delta x \cdot \Delta mv \geq \frac{h}{4\pi}$

$\frac{\text{rate}_A}{\text{rate}_B} = \frac{\overline{u}_A}{\overline{u}_B} = \frac{\sqrt{M_{mB}}}{\sqrt{M_{mA}}}$

$\Delta E = -2.178 \times 10^{-18}\,\text{J}\left(\frac{1}{n^2_{final}} - \frac{1}{n^2_{initial}}\right)$

$\overline{u} = \sqrt{\frac{3RT}{M_m}}$

$\hat{H}\Psi = E\Psi$

<u>constants</u>:

R = 0.08206 L atm/(mol K) = 8.315 kPa dm^3/(mol K) = 8.315 J/(mol K) = 62.36 Torr L/(mol K)

1.000 atm = 760. Torr = 101.3 kPa

N_A = 6.022 x 10^{23} mol^{-1}

c = 2.998 x 10^8 m/s

h = 6.626 x 10^{-34} J s

STP = 1.0000 atm pressure and 273.15 K

standard conditions = 1.00000 atm, 1.00000 M, and 298.15 K

kilo = 10^3

milli = 10^{-3}

pico = 10^{-12}

centi = 10^{-2}

nano = 10^{-9}

Pa = N m^{-2}

N = kg m s^{-2}

J = N m = kg m^2 s^{-2}

