Constants you might need

Acceleration due to gravity	g = 9.80 m/s^2
Stefan-Boltzmann constant	$\sigma = 5.67 \times 10^{-8}$ $W/m^2 K^4$
Solar constant	S = 1367 W/m^2
Elementary charge	1.6×10^{-19} C
Density of air	1.21 kg/m^3
Density of water	$\rho = 1000$ kg/m^3

Conversions

Energy	1 kcal = 4.2 kJ
Speed	1 m/s = 3.6 km/h

Kinematics

Quadratic Equation: $\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

1) $v_f = v_0 + at$

2) $x_f = x_0 + v_0 t + \frac{1}{2}at^2$

3) $v_f^2 = v_0^2 + 2a\Delta x$

$\Delta x = x_f - x_0$

$v = \frac{\Delta x}{\Delta t}$

$a = \frac{\Delta v}{\Delta t}$

Dynamics

$\vec{F}_{net} = m\,\vec{a}$ $\quad F_D = \frac{1}{2}\rho_{air} C\,A\,v^2$ $\quad W = mg$

$f_k = \mu_k N$ $\quad f_s \le \mu_s N$ $\quad f_{s,max} = \mu_s N$ $\quad f_r = \mu_r N$

Work and Energy

$W = Fd\cos\theta$ $\quad W_{net} = \Delta KE$ $\quad P = \frac{W}{\Delta t} = Fv$ $\quad Eff = \frac{W_{out}}{E_{in}}$

$KE_0 + PE_0 + W_{nc} = KE_f + PE_f$ $\quad \Delta KE = \frac{1}{2}mv_f^2 - \frac{1}{2}mv_0^2$ $\quad \Delta PE = mgy_f - mgy_0$

Heat Transfer

$\Delta E_{th} = Q_{net} = Q_{in} - Q_{out}$ $\quad Q = m\,c\,(T_f - T_i)$ $\quad Q = m\,L_f$ $\quad Q = m\,L_v$

$\frac{Q}{\Delta t} = \frac{kA(T_2-T_1)}{d}$ $\quad \frac{Q}{\Delta t} = \frac{A(T_2-T_1)}{R_{tot}}$ $\quad R_{tot} = \frac{d_1}{k_1} + \frac{d_2}{k_2} + \cdots + \frac{d_N}{k_N}$

$P = \frac{Q}{\Delta t} = e\sigma AT^4$ $\quad \frac{Q_{net}}{\Delta t} = e\sigma A(T_2^4 - T_1^4)$ $\quad \lambda_{peak} = \frac{2.9\times10^6\ nmK}{T}$

Electricity

$Q = Ne$ $\quad I = \frac{\Delta Q}{\Delta t}$ $\quad R = \frac{\rho L}{A}$ $\quad \sigma = \frac{1}{\rho}$ $\quad I = \frac{V}{R}$ $\quad P = I\,V$ $\quad P = \frac{V^2}{R}$

$P = I^2 R$ $\quad \Delta PE = qV$ $\quad R_{tot,series} = R_1 + R_2 + \cdots + R_N$ $\quad \frac{1}{R_{tot,parallel}} = \frac{1}{R_1} + \frac{1}{R_2} + \cdots + \frac{1}{R_N}$