Mechanics:

$\Delta = final - initial$

$v = \frac{\Delta x}{t} \qquad S = \frac{D}{T}$

$a = \frac{v_f - v_i}{t}$

$\Delta x = \frac{1}{2}(v_i + v_f)t$

$\Delta x = v_i t + \frac{1}{2}at^2$

$v_f{}^2 = v_i^2 + 2a\Delta x$

$\Delta x = v_f t - \frac{1}{2}at^2$

$\sin\theta = \frac{\text{opp}}{\text{hyp}}$

$\cos\theta = \frac{\text{adj}}{\text{hyp}}$

$\tan\theta = \frac{\text{opp}}{\text{adj}}$

$\Sigma F = ma$

$F_{friction} = \mu F_N$

$\tau = F_\perp d$

$a_c = \frac{v^2}{r}$

$F_g = G\frac{m_1 m_2}{r^2}$

$(G = 6.673\times10^{-11} N\bullet m^2/kg^2)$

$PE = mgh$

$KE = \frac{1}{2}mv^2$

$PE_{spring} = \frac{1}{2}kx^2$

$W = F_\parallel d \qquad P = \frac{W}{t}$

$\text{Eff (in \%)} = \frac{W_{out}}{W_{in}} \times 100$

$p = mv \qquad I = F\Delta t = \Delta p$

Thermodynamics:

$T_F = \frac{9}{5}T_C + 32.0 \qquad T_K = T_C + 273$

$Q = mc_p\Delta T \qquad Q_{phase} = \pm mL$

$W_{by\ system} = P\Delta V$

$\Delta U = Q - W_{by\ system} = Q + W_{on}$

$* PV = nRT \qquad * U = \frac{3}{2}nRT_K$

$Q_H = Q_C + W \qquad Eff = \frac{W_{out}}{Q_H}$

Harmonic Motion:

$v = \frac{x}{t} \qquad v = f\lambda$

$T = \frac{1}{f} \qquad F = -kx$

$T_{spring} = 2\pi\sqrt{\frac{m}{k}}$

$T_{pendulum} = 2\pi\sqrt{\frac{\ell}{g}}$

$Intensity = \frac{P}{4\pi r^2}$

Electricity:

$1\ electron = -1.602\times10^{-19} C$

$k_C = \frac{1}{4\pi\varepsilon_0} = 9\times10^9\ \text{Nm}^2/\text{C}^2$

$F_{electric} = k_C\frac{|q_1 q_2|}{r^2} = qE$

$E = k_C\frac{|q|}{r^2} = \frac{V}{\Delta d} = qV$

$PE = k_c\frac{q_1 q_2}{r} \qquad \Delta PE = -qE\Delta d$

$V = k_C\frac{q}{r} \qquad \Delta V = -E\Delta d$

$C = \frac{|Q|}{\Delta V} \qquad C = \varepsilon_0\frac{A}{d}$

$PE_{cap} = \frac{1}{2}|Q|\Delta V$

$V = IR \qquad P = IV \qquad I = \frac{Q}{\Delta t}$

$* R = \rho\frac{\ell}{A}$

* Rotational Motion: (APC)

$\Delta\theta_R = \frac{1}{2}(\omega_i + \omega_f)\Delta t$

$\omega_f = \omega_i + \alpha\Delta t$

$\Delta\theta_R = \omega_i(\Delta t) + \frac{1}{2}\alpha(\Delta t)^2$

$\omega_f{}^2 = \omega_i{}^2 + 2\alpha\Delta\theta_R$

$s = r\theta,\ v = r\omega,\ a = r\alpha$

$\Sigma\tau = I\alpha$

$KE = \frac{1}{2}mv^2 \qquad W = \tau\theta$

$L = I\omega = mrv$

Light and Optics:

$v = f\lambda \qquad n = \frac{c}{v}$

$n_1\sin\theta_1 = n_2\sin\theta_2$

$\sin\theta_C = \frac{n_2}{n_1}$

$\frac{1}{d_i} + \frac{1}{d_o} = \frac{1}{f} \qquad f = \frac{C}{2}$

$M = \frac{h_i}{h_o} = -\frac{d_i}{d_o}$

$* x_{double\ slit} \approx \frac{m\lambda L}{d} \qquad d\sin\theta = m\lambda$

* Fluid Dynamics: (APB)

$\rho = \frac{m}{V} \qquad A_1 v_1 = A_2 v_2 \qquad F_{buoy} = \rho V g$

$P = \frac{F}{A} = \rho gh \qquad P_{abs} = P_{gauge} + P_{atm}$

$P_1 + \rho gh_1 + \frac{1}{2}\rho v_1{}^2 = P_2 + \rho gh_2 + \frac{1}{2}\rho v_2{}^2$

Magnetism:

$F_B = qvB = BI\ell \qquad * B_{wire} = \frac{\mu_0 I}{2\pi r}$

$\mu_0 = 4\pi\times10^{-7} T\bullet m/A$

$* \mathcal{E} = -N\frac{\Delta\phi}{t} \qquad * \Delta\phi = \Delta BA\cos\theta$

$* \mathcal{E} = B\ell v_{wire}$

Atomic and Nuclear:

$E = hf \qquad h = 6.63\times10^{-34} J\bullet s$

$KE_{max} = hf - \phi \qquad * p_{photon} = \frac{E}{c}$

$* E = mc^2 \qquad * \lambda = \frac{h}{p}$