Physics Formula Sheet

$\vec{v_{av}} = \left(\frac{\vec{v_1}+\vec{v_2}}{2}\right)$	$\vec{v_2} = \vec{v_1} + \vec{a}\Delta t$	$\vec{\Delta d} = \left(\frac{\vec{v_1}+\vec{v_2}}{2}\right)\Delta t$	$\vec{\Delta d} = \vec{v_1}\Delta t + \frac{1}{2}\vec{a}\Delta t^2$
$\vec{\Delta d} = \vec{v_2}\Delta t - \frac{1}{2}\vec{a}\Delta t^2$	$\vec{v_2}^2 = \vec{v_1}^2 + 2\vec{a}\vec{\Delta d}$	$\Delta t = \frac{2v_1 sin\theta}{g}$	$\Delta d_x = \frac{v_1^2 sin2\theta}{g}$
$\vec{v_{og}} = \vec{v_{om}} + \vec{v_{mg}}$	$F_g = mg$	$F_g = \frac{Gm_1m_2}{r^2}$	$T = 2\pi\sqrt{\frac{L}{g}}$
$\vec{F_{net}} = ma$	$F_f = \mu F_N$	$a_c = \frac{v^2}{r}$	$a_c = \frac{4\pi^2 r}{T^2}$
$a_c = 4\pi^2 r f^2$	$\frac{F_1}{F_2} = \frac{r_2^2}{r_1^2}$	$F_e = kx$	$E_e = \frac{1}{2}kx^2$
$W = \vec{F}\vec{\Delta d}$	$E_g = mgh$	$E_k = \frac{mv^2}{2}$	$W = \Delta E$
$W = E_{k2} - E_{k1}$	$W = E_{g2} - E_{g1}$	$P = \frac{W}{\Delta t} = \frac{\Delta E}{\Delta t}$	$E_t = E_t'$
$E_t = E_g + E_k + E_e + ...$	$E_\gamma = E_i - E_f(emission)$	$t_o = \frac{t}{\sqrt{1-\frac{v^2}{c^2}}}$	$L_o = \frac{L}{\sqrt{1-\frac{v^2}{c^2}}}$
$m = \frac{m_o}{\sqrt{1-\frac{v^2}{c^2}}}$	$E = mc^2$	$E_h = mc\Delta t$	$m_c c_c \Delta t_c = -m_h c_h \Delta t_h$
$L_f = \frac{E_h}{m}$	$L_v = \frac{E_h}{m}$	$E_k = \frac{p^2}{2m}$	$\vec{p} = m\vec{v}$
$W = \vec{F}cos\theta\vec{\Delta d}$	$\vec{F}\Delta t = \vec{\Delta p}$	$Eff. = \frac{Useful\ Energy\ Output}{Energy\ Input}x100\%$	$\vec{p} = \vec{p'}$
$v_1' = v_1\left(\frac{m_1-m_2}{m_1+m_2}\right)$	$v_2' = v_1\left(\frac{2m_1}{m_1+m_2}\right)$	$E_g = \frac{-Gm_1m_2}{r}$	$E_t = \frac{1}{2}E_g$
$v = \sqrt{\frac{2GM}{r}}$	$E_t = E_g + E_k$	$E_k = E_b = \lvert E_t \rvert$	$f = \frac{1}{T}$
$f = \frac{\#\ of\ cycles}{\Delta t}$	$v = f\lambda$	$n_1 sin\theta_1 = n_2 sin\theta_2$	$sin\theta_c = \frac{n_2}{n_1}$
$\frac{n_1}{n_2} = \frac{v_2}{v_1} = \frac{\lambda_2}{\lambda_1}$	$\frac{1}{f} = \frac{1}{d_i} + \frac{1}{d_o}$	$M = \frac{h_i}{h_o} = \frac{-d_i}{d_o}$	$P = \frac{1}{f}$
$x_n = \frac{\left(n-\frac{1}{2}\right)L\lambda}{d}$	$\frac{x_n}{L} = sin\theta_n$	$x_n = \frac{nL\lambda}{d}$	$y_n = \frac{\left(n+\frac{1}{2}\right)L\lambda}{w}$
$\frac{y_n}{L} = sin\theta_n$	$y_n = \frac{nL\lambda}{w}$	$\Delta x = \frac{L\lambda}{d}$	$\Delta y = \frac{L\lambda}{w}$
$p = \frac{h}{\lambda}$	$\Delta x = \frac{L\lambda}{2t}$	$I = \frac{q}{\Delta t}$	$V = \frac{E}{q}$
$E = qI\Delta t$	$q = ne$	$V = IR$	$\frac{R_1}{R_2} = \frac{A_2}{A_1} = \frac{L_1}{L_2}$
$V_T = V_1 + V_2 + V_3 +\ ...\ + V_n$	$P = I^2R$	$I_T = I_1 + I_2 + I_3 +\ ...\ + I_n$	$R_T = R_1 + R_2 + R_3 +\ ...\ + R_n$
$P = \frac{V^2}{R}$	$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}\ + \frac{1}{R_n}$	$P = VI$	$Cost = Energy\ \times\ Rate$
$\frac{V_p}{V_s} = \frac{N_p}{N_s} + \frac{I_s}{I_p}$	$F_e = \frac{kq_1q_2}{r^2}$	$\vec{F_e} = q\vec{\epsilon}$	$\epsilon = \frac{kq}{r^2}$
$E_e = \frac{kq_1q_2}{r}$	$\epsilon = \frac{V}{d}$	$V = \frac{kq}{r}$	$F_m = qvBsin\theta$
$F_m = BILsin\theta$	$\frac{e}{m} = 1.76 \times 10^{11}\ C/kg$	$\frac{q}{m} = \frac{\epsilon}{B^2r}$	$B = \mu_o\left(\frac{I}{2\pi r}\right)$
$B = \mu_o\left(\frac{NI}{L}\right)$	$E_\gamma = hf$	$f = \frac{c}{\lambda}$	$E_\gamma = E_k + W$
$E_\gamma = E_f - E_i\ (absorption)$	$E_\gamma = E_i - E_f\ (emission)$	$\lambda = \frac{h}{mv}$	$d_2 = d_1\left(\frac{n_2}{n_1}\right)$
$\frac{B_1}{B_2} = \frac{N_1I_1\mu_1d_2}{N_2I_2\mu_2d_1}$	$v_s = 332 + 0.6T$	$f_2 = f_1\left(1 \pm \frac{v_o}{v_s}\right)$	$f_2 = f_1\left(\frac{v_s}{v_s \pm v_o}\right)$
$\beta = 10log\left(\frac{I_2}{I_1}\right)$	$I = \frac{P}{4\pi r^2}$	$\frac{I_1}{I_2} = \frac{r_2^2}{r_1^2}$	$L_n = \frac{n\lambda}{2}$
$\Delta L = \frac{\lambda}{2}$	$L_n = \frac{(2n-1)}{\lambda}$	$\frac{f_1}{f_2} = \frac{L_2d_2\sqrt{T_1}\sqrt{\rho_2}}{L_1d_1\sqrt{T_2}\sqrt{\rho_1}}$	$f_b = \lvert f_2 - f_1 \rvert$
$v = \sqrt{\frac{GM}{r}}$	$C = \frac{R^3}{T^2}$	$F_2 = \frac{\mu_oI_1I_2L}{2\pi d}$	$f_n = nf_o$
$tan\theta_p = \frac{n_2}{n_1}$	$\lvert PS_1 - PS_2 \rvert = \left(n - \frac{1}{2}\right)\lambda$	$\lvert PS_1 - PS_2 \rvert = n\lambda$	$\frac{\lambda}{w} \geq\ 1$

Constants

$e = 1.6 \times 10^{-19}\ C$	$m_{proton} = 1.67 \times 10^{-27}\ kg$	$g = 9.8\ N/kg$	$m_{electron} = 9.11 \times 10^{-31}\ kg$
$m_{Earth} = 5.98 \times 10^{24}\ kg$	$n_{diamond} = 2.42$	$n_{water} = 1.33$	$n_{zircon} = 1.92$
$h = 6.626 \times 10^{-34}\ J \cdot s$	$k = 9.0 \times 10^9\ N \cdot m^2/kg^2$	$c = 3 \times 10^8\ m/s$	$G = 6.67 \times 10^{-11}\ N \cdot m^2/kg^2$
$R_{Earth} = 6.38 \times 10^6\ m$	$\mu_o = 4\pi \times 10^{-7}\ T \cdot m/A$	$C_{H_2O} = 4.18 \times 10^3\ J/kg \cdot^o C$	$L_f(H_2O) = 3.3 \times 10^5\ J/kg$
$L_v(H_2O) = 2.3 \times 10^6\ J/kg$	$\Delta d_{Earth-Sun} = 1.50 \times 10^{11}\ m$	$\Delta d_{Earth-moon} = 3.85 \times 10^8\ m$	$m_{moon} = 7.35 \times 10^{22}\ kg$
$m_{Sun} = 1.99 \times 10^{30}\ kg$			