Physics Formulas

Chapter 1	Chapter 2	Chapter 3
$y = mx + b$ $m = \frac{rise}{run} = \frac{\Delta y}{\Delta x}$ $y = ax^2 + bx + c$ $y = \frac{a}{x}$	$\Delta t = t_f - t_i$ $\Delta d = d_f - d_i$ $\bar{v} = \frac{\Delta d}{\Delta t} = \frac{d_f - d_i}{t_f - t_i}$ $d = \bar{v}t + d_i$	$\bar{a} = \frac{\Delta v}{\Delta t} = \frac{v_f - v_i}{t_f - t_i}$ $v_f = v_i + \bar{a}\Delta t$ $d_f = d_i + v_i t_f + \frac{1}{2}\bar{a}{t_f}^2$ ${v_f}^2 = {v_i}^2 + 2\bar{a}(d_f - d_i)$
Chapter 4	**Chapter 5**	**Chapter 6**
$a = \frac{f_{net}}{m}$ $F_{A\ on\ B} = -F_{B\ on\ A}$	$R^2 = A^2 + B^2$ $R^2 = A^2 + B^2 - 2AB\ cos\ \theta$ $\frac{R}{\sin\theta} = \frac{A}{\sin a} = \frac{B}{\sin b}$ $A_x = A\cos\theta$ $A_y = A\sin\theta$ $\theta = tan^{-1}\left(\frac{R_y}{R_x}\right)$ $F_{f,kinetic} = \mu_k F_N$ $F_{f,static} \leq \mu_k F_N$	$a_c = \frac{v^2}{r}$ $a_c = \frac{4\pi^2 r}{T^2}$ $F_{net} = ma_c$ $v_{a/b} + v_{b/c} = v_{a/c}$
Chapter 7		**Chapter 8**	**Chapter 9**
$\left(\frac{T_A}{T_B}\right)^2 = \left(\frac{r_A}{r_B}\right)^3$ $F = G\frac{m_1 m_2}{r^2}$ $G = 6.67\ x\ 10^{-11}\ N \cdot m^2/kg^2$ $T^2 = \left(\frac{4\pi^2}{Gm_s}\right)r^3$ $v = \sqrt{\frac{Gm_e}{r}}$	$T = 2\pi\sqrt{\frac{r^3}{Gm_e}}$ $g = \frac{Gm}{r^2}$ $m_{inertial} = \frac{f_{net}}{a}$ $m_{grav} = \frac{r^2 F_{grav}}{Gm}$	$\omega = \frac{\Delta\theta}{\Delta t}$ $\alpha = \frac{\Delta\omega}{\Delta t}$ $d = r\theta$ $v = r\omega$ $a = r\alpha$ $\tau = Frsin\theta$ $I = mr^2$ $\alpha = \frac{\tau_{net}}{I}$	$p = mv$ $Impulse = F\Delta t$ $F\Delta t = p_f - p_i$ $L = I\omega$ $\tau\Delta t = L_f - L_i$

Chapter 10		Chapter 11	Chapter 12
$W = Fd$ $KE = \frac{1}{2}mv^2$ $W = \Delta KE$ $W = Fd\cos\theta$ $P = \frac{W}{t}$	$MA = \frac{F_r}{F_e}$ $IMA = \frac{d_e}{d_r}$ $e = \frac{W_o}{W_i}\ x\ 100$ $e = \frac{MA}{IMA}\ x\ 100$	$PE = mgh$ $E_0 = mc^2$ $E = KE + PE$ $KE_{before} + PE_{before} =$ $KE_{beafterfore} + PE_{after}$	$Q = mc\Delta T = mC(T_f - T_i)$ $E_A + E_B = constant$ $Q = mH_f$ $Q = mH_v$ $\Delta U = Q - W$ $\Delta S = \frac{Q}{T}$
Chapter 13		**Chapter 14**	**Chapter 15**
$P = \frac{F}{A}$ $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$ $PV = nRT$ $F_2 = \frac{F_1A_2}{A_1}$ $P = \rho hg$ $F_{buoyant} = \rho_{fluid}Vg$ $\alpha = \frac{\Delta L}{L_1\Delta T}$ $\beta = \frac{\Delta V}{V_1\Delta T}$		$F = -kx$ $PE_{spring} = \frac{1}{2}kx^2$ $T = 2\pi\sqrt{\frac{l}{g}}$ $f = \frac{1}{T}$ $\lambda = \frac{v}{f}$	$f_d = f_s\left(\frac{v - v_d}{v - v_s}\right)$
Chapter 16		**Chapter 17**	**Chapter 18**
$E = \frac{P}{4\pi r^2}$ $I_2 = I_1\cos^2\theta$ $\lambda_0 = \frac{c}{f}$ $f_{obs} = f\left(1 \pm \frac{v}{c}\right)$ $\Delta\lambda = (\lambda_{obs} - \lambda) = \pm\frac{v}{c}\lambda$		$\theta_r = \theta_i$ $d_i = -d_0$ $h_i = h_0$ $\frac{1}{f} = \frac{1}{d_i} + \frac{1}{d_0}$ $m = \frac{h_i}{h_0} = \frac{-d_i}{d_0}$	$n_1 sin\theta_1 = n_2 sin\theta_2$ $n = \frac{c}{v}$ $sin\theta_c = \frac{n_2}{n_1}$ $\frac{1}{f} = \frac{1}{d_i} + \frac{1}{d_0}$ $m = \frac{h_i}{h_0} = \frac{-d_i}{d_0}$

Chapter 19	Chapter 20	Chapter 21
$\lambda = \frac{xd}{L}$ $2x_1 = \frac{2\lambda L}{\varpi}$ $\lambda = d\ sin\theta$ $x_{obj} = \frac{1.22\lambda L_{obj}}{D}$	$F = K\frac{q_A q_B}{r^2}$	$E = \frac{F}{q'}$ $\Delta V = \frac{W}{q'}$ $\Delta V = Ed$ $C = \frac{q}{\Delta V}$
Chapter 22	**Chapter 23**	**Chapter 24**
$P = IV$ $R = \frac{V}{I}$ $P = I^2R\ \ or\ P = \frac{V^2}{R}$ $E = Pt = \ I^2Rt = \left(\frac{v^2}{R}\right)t$	$R = R_A + R_B + \cdots$ $I = \frac{v_{source}}{R}$ $\frac{1}{R} = \frac{1}{R_A} + \frac{1}{R_B} + \frac{1}{R_C} + \cdots$	$F = ILB$ $F = qvB$
Chapter 25	**Chapter 26**	**Chapter 27**
$EMF = BLv\ sin\ \theta$ $I_{eff} = 0.707I_{max}$ $V_{eff} = 0.707V_{max}$ $\frac{I_s}{I_p} = \frac{V_p}{V_s} = \frac{N_p}{N_s}$	$\frac{q}{m} = \frac{v}{Br}$ $\frac{q}{m} = \frac{2V}{B^2r^2}$ $\lambda = \frac{v}{f}$	$E = nhf$ $E = hf = \frac{hc}{\lambda} = \frac{1240\ eV \cdot nm}{\lambda}$ $KE = hf - hf_0$ $p = \frac{hf}{c} = \frac{h}{\lambda}$ $\lambda = \frac{h}{p} = \frac{h}{mv}$
Chapter 28	**Chapter 29**	**Chapter 30**
$E_n = -13.6eV\ x\ \frac{1}{n^2}$ $E_{photon} = E_f - E_i$ $r_n = \frac{h^2n^2}{4\pi^2Kmq^2}$		$E = mc^2$ $remaining = original\left(\frac{1}{2}\right)^t$