PHY 1053 and 1054 Formula sheet

\[ S = S_0 + v_0 t + \frac{1}{2} at^2 \quad F_{net} = ma \quad a_c = \frac{v^2}{r} \quad W_{total} = \Delta K \]

\[ W = Fdcos\theta \quad \vec{F} = \vec{F} \Delta t = \vec{F} \]

\[ v = r\omega \quad \tau = F_{perp} \]

\[ x = A \cos(\omega t) \quad v = -\omega A \sin(\omega t) \quad a = -\omega^2 A \cos(\omega t) \]

\[ P_0A - \rho A - \rho ghA = 0 \quad P + \rho g + \frac{1}{2} \rho v^2 = \text{constant} \]

\[ Q = mc\Delta T \quad Q = Lm \quad PV = nRT \quad W = P\Delta V \]

\[ W = nRT \ln\left(\frac{V_2}{V_1}\right) \quad \Delta U = -W \quad \Delta U = Q \quad p(V_2 - V_1) = W \]

\[ P_1V_1^\gamma = P_2V_2^\gamma \quad T_1V_1^{\gamma-1} = T_2V_2^{\gamma-1} \quad e = \frac{W}{Q_H} = 1 - \left| \frac{Q_c}{Q_H} \right| \]

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\[ F = \frac{kq_1q_2}{r^2} \quad E = \frac{k|q|}{r^2} \quad \varphi_E = EA \cos \theta \quad W = qEd \]

\[ E = \frac{Q}{\varepsilon_0A} \quad \frac{1}{C} = \frac{1}{C_1} + \frac{1}{C_2} \quad C = C_1 + C_2 \quad R = R_1 + R_2 \]

\[ \frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} \quad V = IR \quad P = IV = I^2R \quad F = |q|vB \sin \theta \]

\[ F = lB \sin \theta \quad \tau = NIAB \sin \theta \quad B = \frac{\mu_0l}{2\pi r} \quad \varphi = BA \cos \theta \]

\[ \varepsilon = \omega AB \sin(\omega t) \quad \text{Junction: } I_{in} = I_{out} \quad \text{Loop: sum of } V \text{ in loop } = 0 \]

\[ I = \frac{1}{2} \varepsilon_0E_{\text{max}}^2 \quad \frac{\sin \theta_a}{\sin \theta_b} = \frac{n_b}{n_a} \quad \frac{1}{s} + \frac{1}{s'} = \frac{1}{f} \quad m = \frac{y'}{y} = \frac{s'}{s} \]

\[ \frac{1}{f} = (n - 1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right) \quad r_2 - r_1 = (m + \frac{1}{2})\lambda \quad y_m = R \frac{m\lambda}{d} \quad d \sin \theta = m\lambda \]

Momentum is conserved in all collisions; Energy is conserved in elastic collisions.

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