PHYSICS FORMULAS

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Motion

$v_f = v_o + at$

$v_f^2 = v_o^2 + 2ad$

$d = {}^1/_2\, at^2 + v_o t$

Planets

$F = ma$

$F = mv^2/r$

$F = G \dfrac{(m_o m_p)}{r^2}$

Torque

$\tau = rF$

Work

$W = Fd$

$W = \Delta KE$

$W = P\Delta V$

Power

$P = IV = i^2R$

$P = \text{watt} = {}^J/_s = {}^W/_s = {}^E/_s$

Energy

$E_T = U + KE$

$KE = {}^1/_2\, mv^2$

$U = mgh$

$F_f = \mu N$

Collisions

$J = I = \Delta mv = F\Delta t$

$m_1v_1 + m_2v_2 \ldots = m_1v_1' + m_2v_2' \ldots$

${}^1/_2\, m_1v_1^2 + {}^1/_2\, m_2v_2^2 \ldots = {}^1/_2\, m_1v_1^{2'} + {}^1/_2\, m_2v_2^{2'} \ldots$

Light

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

$N = {}^c/_v$

$m = {}^{-i}/_o$

	+	-
F	Convergent	divergent
I	Real	virtual
O	Always	never
M	Erect	inverted

${}^1/_f = {}^1/_o + {}^1/_i$

	Lens	Mirrors
Convergent	convex ( )	concave)
Divergent	concave) (	convex (

Capacitance

$C \alpha {}^A/_d$

$C = {}^Q/_V$

Thermodynamics

$\Delta G = -NFE = -RT \ln K_{eq}$

$\Delta S = \Delta S_{products} - \Delta S_{reactants}$

$\Delta H = H_{products} - H_{reactants}$

Waves

$E = hf$

$f = {}^1/_T$

$v = f\lambda$

$\lambda = 2L/N$

$\lambda = 4L/N$

$v_{sound} = 330\ {}^m/_s$

$f_{observed} = f_{actual} \dfrac{v \pm v_{detector}}{v -/+ v_{source}}$

Electrics & Magnetism

$\beta = \dfrac{m_o i}{2\pi r}$ Linear Wire

$\beta = \dfrac{m_o i}{2r}$ Circular Wire

$F = iLB\sin\theta$

$F = qVB\sin\theta$

$U = k\dfrac{qQ}{r}$

$V = k\dfrac{Q}{r}$

$F = k\dfrac{q_1q_2}{r^2}$

$V = Ed$

$V = {}^U/_q$

$E = {}^F/_q$

$i = \dfrac{\Delta q}{\Delta t}$

Young's

$Y = \dfrac{\text{stress}}{\text{strain}}$

Circuits

$V = iR$

$R_{series} = R_1 + R_2 \ldots$

$\dfrac{1}{R_{parallel}} = \dfrac{1}{R_1} + \dfrac{1}{R_2} \ldots$

$C_{parallel} = C_1 + C_2 \ldots$

$\dfrac{1}{C_{series}} = \dfrac{1}{C_1} + \dfrac{1}{C_2}$

Springs & Pendulums

$\omega = \sqrt{{}^g/_l} = 2\pi f$

$\omega = \sqrt{{}^k/_m} = 2\pi f$

$F = -kx$

$U = {}^1/_2 kx^2$

$v_{light} = 3 \times 10^8\ {}^m/_s$

$U = \pm Q \pm W$

Fluids

$A_1V_1 = A_2V_2$

$F_{bouyant} = \rho vg$

$\rho_1 + {}^1/_2\, \rho v^2 + \rho gh = \rho_2 + {}^1/_2\, \rho v^2 + \rho gh$

$P_H = \rho gh + P_o$

$P = {}^F/_A$

Radioactive Decay

α, β, $\beta_{(positron)}$, γ

% remaining $= 1/2^n$

Newton's Three Laws

1) Inertia: a body in motion stays in motion unless acted upon by an outside force
2) F = ma
3) Every action has an equal and opposite reaction

Think

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