1st Semester Formulas

Kinematics

$v = \frac{\Delta x}{\Delta t}$

$\Delta x = v\,\Delta t$

$v = \frac{v_f + v_i}{2}$

$a = \frac{v_{f-}v_i}{t}$

$\text{Slope} = \frac{rise}{run}$

$v_f = v_i + at$

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

$v_f^2 = v_i^2 + 2a(\Delta x)$

Dynamics

$\Sigma F = ma$

$F_w = mg$

$F_f = \mu F_N$

$F = -F$

Projectiles

$\Delta x = v\,\Delta t$

$v_{fy} = v_{iy} + a_y t$

$\Delta Y = v_{iy} t + \frac{1}{2} a_y t^2$

$v_{fy}^2 = v_{iy}^2 + 2a_y(\Delta Y)$

Circular and Gravity

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

$G = 6.67 \times 10^{-11} Nm^2/kg^2$

$T = 2\pi\sqrt{\frac{l}{g}}$

$v_c = \frac{2\pi r}{T}$

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

$a_c = \frac{4\pi^2 r}{T^2}$

$F_c = ma_c$

$F_c = \frac{m4\pi^2 r}{T^2}$

$F_c = \frac{mv_c^2}{r}$

Momentum

$p = mv$

$p_b = p_a$

$\Delta p = Ft$

$m\Delta v = Ft$

$m(v_f - v_i) = Ft$

Fluids

$P = F/A$

$A_{circle} = \pi r^2$

$A_{rec} = lw$

$P_1 = P_2$

$P_{sub} = \rho gh$

$\rho = m/V$

$V = lwh$

Work and Energy

$W = fd$

$P = \frac{W}{t}$

$E_b = E_a$

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

$PE = mgh$

$EE = pt$

$EE = vit$

$E = mc^2$

2nd Semester Formulas

Electricity

$F = \frac{kq_1q_2}{r^2}$

$k=9x10^9\ Nm^2/C^2$

$F=qE$

$a=\frac{qE}{m}$

$I=\frac{\Delta q}{\Delta t}$

$E=\frac{F}{q}$

$V=Ed$

$R = \frac{\rho l}{A}$

$R_T=R_1+R_2+\ldots$

$1/R_T=1/R_1+1/R_2+\ldots$

$v=ir$

$p=vi$

$p=i^2R$

$C_T = C_1 + C_2 + \ldots$

$1/C_T =1/C_1 + 1/C_2 + \ldots$

$\tau=RC$

$E_c= ½\ Cv^2$

$V_{rms}=.707\ v_{max}$

$V_{rms}= .3535\ v_{p-p}$

Magnetism

$EMF=vBL$

$F=BLi$

$N_s/N_p=v_s/v_p$

$P_s=P_p$

$L_T+L_1+ L_2+\ldots$

$1/L_T=1/L_1+ 1/L_2+\ldots$

$E= ½\ LI^2$

Thermodynamics

$T_c=5/9\ (T_F - 32)$

$T_F= 9/5\ T_C + 32$

$T_C = T_K -273$

$PV=nRT$

$\Delta L= \alpha L_o \Delta T$

$Q=mc\Delta T$

$Q=mH_{v\ or\ f}$

$-Q_L=Q_G$

Waves and Sound

$v=\frac{\lambda}{T}$

$T=\frac{1}{f}$

$v=\lambda f$

$I=\frac{p}{A} = \frac{p}{4\pi r^2}$

$f_n=n\left(\frac{v}{2L}\right)$

$f_n=n\left(\frac{v}{4L}\right)$

Optics

$n\ \lambda=d\ \sin\theta$

SOH-CAH-TOA

$A^2+B^2=C^2$

$c= \lambda f$

$\theta_i=\theta_R$

$n=c/v$

$n_i\sin\theta_i=n_R\sin\theta_R$

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

$f= ½\ R$

$\frac{1}{f} = \frac{1}{d_i} + \frac{1}{d_o}$

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