Physics 11 Formula Sheet 2020

KINEMATICS

$v_{ave} = \frac{\Delta d}{\Delta t}$ $a = \frac{\Delta v}{\Delta t}$ $v_2 = v_1 + at$ $v_2^2 = v_1^2 + 2a\Delta d$ $d = v_1 t + \frac{1}{2} at^2$

FORCE

$\sum F = ma$ $F_e = k\,\Delta x$ $F_f = \mu N$ $F_g = mg$ $F_g = \frac{Gm_1m_2}{d^2}$

MOMENTUM

$p = mv$ $\Delta p = m\Delta v = F\Delta t$

ENERGY WORK AND POWER

$E_p = mg\Delta h$ $E_k = \frac{1}{2} mv^2$ $Q = mc\Delta T$ $Eff = \frac{\text{Power out}}{\text{Power input}} \times 100\%$

$W = Fd$ $P = \frac{W}{t}$ $W = \Delta E$

$P_{wind} = \frac{1}{2}\ 1.225\ \pi r^2 v^3$

WAVES

Period (seconds) → $T = \frac{1}{f}$ Frequency (hertz) → $f = \frac{1}{T}$ ← Period (seconds)

$v = f\lambda$

v = velocity
f = frequency
λ = wavelength

NUCLEAR

$E = mc^2$

CONSTANTS

$g = 9.8\ m/s^2$ $G = 6.67 \times 10^{-11}\ Nm^2/kg^2$ $c = 3.00 \times 10^8\ m/s$

$m_e = 5.98 \times 10^{24}\ kg$ $R_e = 6.38 \times 10^6\ m$

RELATIVITY

Relativity Equations

Change in Length

$l = l_0 \sqrt{1 - \frac{v^2}{c^2}}$ v = velocity of object, c = velocity of light

Where l = observed length, l_0 = rest length

Change in Time

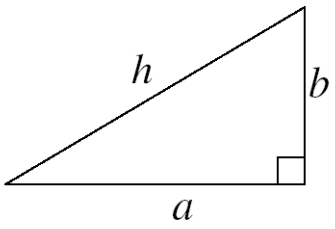
$t = t_0 \sqrt{1 - \frac{v^2}{c^2}}$

Where t = observed time, t_0 = rest time

Change in Mass

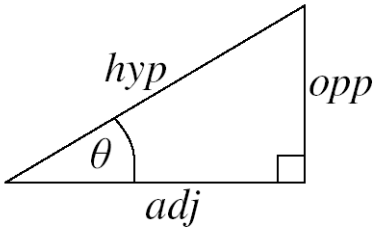
$m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$

Where m = observed mass, m_0 = rest mass



Pythagoras's Theorem

$a^2 + b^2 = h^2$



Trigonometric Ratios

$$\sin(\theta) = \frac{opp}{hyp}$$

$$\cos(\theta) = \frac{adj}{hyp}$$

$$\tan(\theta) = \frac{opp}{adj}$$