PHYSICS IN MOTION
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Equations List

$v_f = v_i + at$

$d = \frac{1}{2}(v_i + v_f)t$

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

$v_f^2 = v_i^2 + 2ad$

$v = \frac{d}{t}$

$F_{net} = ma$

$F_G = \frac{Gm_1 m_2}{r^2} = mg$

$F_S \leq \mu_S N$

$F_k = \mu_k N$

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

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

$F_S = -kx$

$p = mv$

$I = F\Delta t$

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

$PE_G = \frac{Gm_1 m_2}{r} = mgh$

$W = Fd$

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

$PE_S = \frac{1}{2}kx^2$

$F_E = \frac{kq_1 q_2}{r^2}$

$F_E = qE$

$PE_E = \frac{kq_1 q_2}{r} = qV$

v = velocity
a = acceleration
t = time
d or x = displacement
F_{net} = net force
m = mass or order number
F_G = force due to gravity
G = gravitational constant
r = radius
g = acceleration due to gravity
F_S = spring force or static force
μ_s = coefficient of static friction
μ_k = coefficient of kinetic friction
a_c = centripetal acceleration
v_T = tangential velocity
T = period
k = spring constant or Coulomb's constant
p = momentum
I = impulse
F = force
KE = kinetic energy
PE_G = gravitational potential energy
h = height
W = work
P = power
PE_S = spring potential energy
F_E = electrostatic force
q = charge
E = electric field
PE_E = electric potential energy
V = electric potential

equations continued on next page

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Equations List

$$V = \frac{kq_1}{r}$$

$$V = IR$$

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

$$P = IV$$

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

$$F_B = qvB$$

$$F_B = BI\ell$$

$$T_p = 2\pi\sqrt{\frac{\ell}{g}}$$

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

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

$$v = \lambda f$$

$$n = \frac{c}{v}$$

$$n_1 \sin\Theta_1 = n_1 \sin\Theta_2$$

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

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

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

$$f = \frac{R}{2}$$

$$y_{min} \approx \frac{L\lambda m}{a}$$

$$y_{max} \approx \frac{L\lambda m}{b}$$

$$E = \Delta mc^2$$

$$m_{remaining} = m_{initial}(1/2)^{\#HLs}$$

$$\#HLs = \frac{t_{total}}{t_{half\text{-}life}}$$

I = current
R = resistance
ρ = resistivity
ℓ = length of wire or length of pendulum
A = cross sectional area
F_B = magnetic force
B = magnetic field
T_p = period of a pendulum
f = frequency or focal length
λ = wavelength
n = index of refraction
c = speed of light
Θ_c = critical angle
d_i = image distance
d_o = object distance
M = magnification
h_i = image height
h_o = object height
R = radius of curvature
y_{min} = distance from central peak to single-slit minima
y_{max} = distance from central peak to double-slit maxima
L = distance from slit to screen
a = width of a single slit
b = distance between double slits
E = energy
Δm = mass defect
HLs = half-lives
$m_{remaining}$ = radioactive mass remaining
$m_{initial}$ = initial radioactive mass
t_{total} = total time
$t_{half\text{-}life}$ = time for one half-life