Physics Reference Tables

Physical Constant	Symbol	Value
Acceleration due to gravity on Earth	g	9.8 m/s/s
Coulomb's law constant	k	$9.0 \times 10^{9} \ \frac{\text{Nm}^2}{\text{C}^2}$
Elementary charge	e	1.6×10^{-19} C
Electron rest mass	m_e	9.11×10^{-31} kg
Gravitational constant	G	$6.67 \times 10^{-11} \ \frac{\text{Nm}^2}{\text{kg}^2}$
Proton rest mass	m_p	1.67×10^{-27} kg
Speed of light in a vacuum	c	3.00×10^{8} m / s
Speed of sound in air at STP		331 m/s

The Index of Refraction for Common Substances	
Air	1.00
Alcohol	1.36
Corn Oil	1.47
Diamond	2.42
Glass, Crown	1.52
Glass, Flint	1.61
Glycerol	1.47
Quartz, Fused	1.46
Water	1.33

Mechanics

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

$x_f = x_i + vt$

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

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

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

$F = ma$

$F_g = mg$

$F = \frac{Gm_1m_2}{r^2}$

$p = mv$

$J = F\Delta t$

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

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

a = uniform acceleration

a_c = centripetal acceleration

F = force

F_c = centripetal force

F_g = weight

g = acceleration due to gravity on Earth

G = gravitational constant

J = impulse

m = mass

p = momentum

r = radius or distance between centers

t = time

v = velocity

x = position

Energy

$W = F\Delta x$

$P = \frac{W}{\Delta t} = F\overline{v}$

$PE_g = mgh$

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

$F = -kx$

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

F = force

g = acceleration due to gravity on Earth

h = height

k = spring constant

KE = kinetic energy

m = mass

P = power

PE_g = gravitational potential energy

PE_s = potential energy stored in a spring

t = time

v = velocity

W = work

x = position

Electricity

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

$$V = IR$$

$$P = VI = I^2R = \frac{V^2}{R}$$

$$E_e = Pt$$

$$E = \frac{F_e}{q} = \frac{kq}{r^2}$$

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

$$E = \frac{V}{d}$$

$$V_pI_p = V_sI_s$$

d = distance between parallel plates

E_e = electrical energy

E = electric field strength

F = force

I = current

k = Coulomb's law constant

P = power

p = transformer primary coil

q = charge

r = radius or distance between centers

R = resistance

s = transformer secondary coil

V = electrical potential or potential difference

Series Circuits

$$I_t = I_1 = I_2 = I_3 = \ldots$$

$$V_t = V_1 + V_2 + V_3 + \ldots$$

$$R_{eq} = R_1 + R_2 + R_3 + \ldots$$

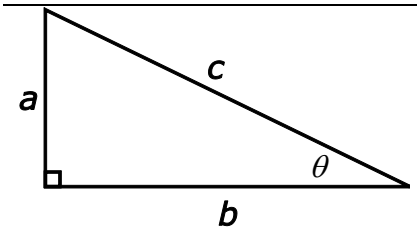
Parallel Circuits

$$I_t = I_1 + I_2 + I_3 + \ldots$$

$$V_t = V_1 = V_2 = V_3 = \ldots$$

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \ldots$$

Mathematical Formulas



$a^2 + b^2 = c^2$

$\sin\theta = \frac{a}{c}$

$\cos\theta = \frac{b}{c}$

$\tan\theta = \frac{a}{b}$

Circumference of a circle = $2\pi r$

Area of a rectangle = length × width

Area of a triangle = $\frac{1}{2}$ base × height

Wave Phenomena

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

$v = f\lambda$

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

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

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

$n_1 v_1 = n_2 v_2$

c = speed of light in a vacuum

f = frequency

n = index of refraction

T = period

v = speed

θ = angle

θ_c = critical angle of incidence

λ = wavelength

Electromagnetic Spectrum
(measurement in meters)