

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	$1.6 \times 10^{-19} \text{ C}$
Electron rest mass	m_e	$9.11 \times 10^{-31} \text{ kg}$
Gravitational constant	G	$6.67 \times 10^{-11} \frac{\text{Nm}^2}{\text{kg}^2}$
Proton rest mass	m_p	$1.67 \times 10^{-27} \text{ kg}$
Speed of light in a vacuum	c	$3.00 \times 10^8 \text{ m/s}$
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

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

v = velocity

$$x_f = x_i + vt$$

t = time

x = position

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

a = uniform
acceleration

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

F = force

m = mass

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

F_g = weight

$$F = ma$$

g = acceleration due to
gravity on Earth

$$F_g = mg$$

G = gravitational
constant

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

d = distance between
centers of mass

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

p = momentum

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

a_c = centripetal
acceleration

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

F_c = centripetal force

r = radius

Energy

$$W = F\Delta x$$

W = work

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

F = force

x = position

$$PE_g = mgh$$

P = power

t = time

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

v = velocity

$$F = -kx$$

PE_g = gravitational
potential energy

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

m = mass

h = height

KE = kinetic energy

k = spring constant

PE_s = potential energy
stored in a spring

Electricity

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

$$V = IR$$

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

F = force

k = Coulomb's law constant

q = charge

d = distance between centers

V = electrical potential difference

I = current

R = resistance

P = power

Series Circuits

$$I_t = I_1 = I_2 = I_3 = \dots$$

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

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

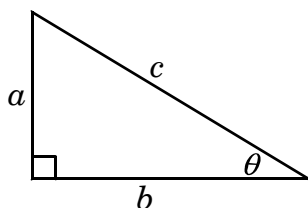
Parallel Circuits

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

$$V_t = V_1 = V_2 = V_3 = \dots$$

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

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 \times width

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

Wave Phenomena

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

$$v = f\lambda$$

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

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

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

$$n_1 v_1 = n_2 v_2$$

T = period

f = frequency

v = speed

λ = wavelength

n = index of refraction

c = speed of light in a vacuum

θ = angle

θ_c = critical angle of incidence

Electromagnetic Spectrum

(measurement in meters)

