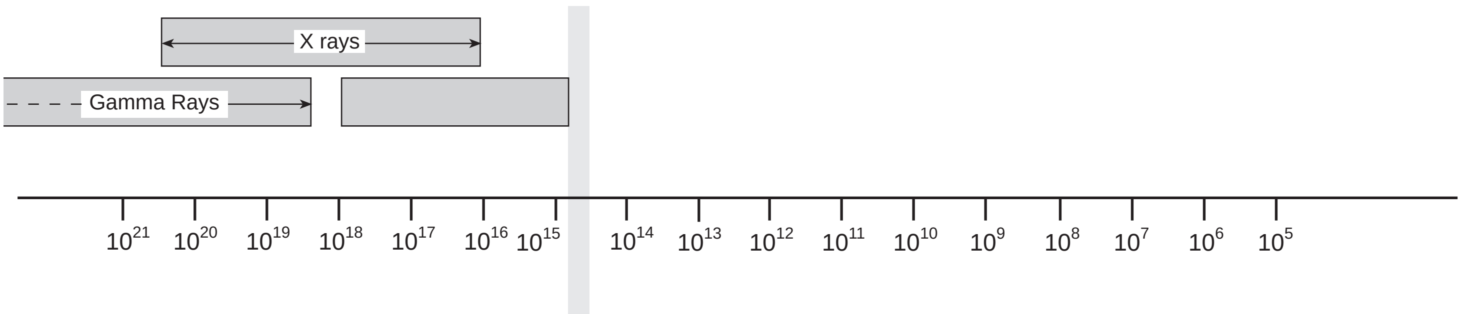
122

Reference Tables for Physical Setting/PHYSICS

2006

Name	Symbol	Value
Universal gravitational constant	G	6.67×10^{-11} N•m^2/kg^2
Acceleration due to gravity	g	9.81 m/s^2
Speed of light in a vacuum	c	3.00×10^{8} m/s
Speed of sound in air at STP		3.31×10^{2} m/s
Mass of Earth		5.98×10^{24} kg
Mass of the Moon		7.35×10^{22} kg
Mean radius of Earth		6.37×10^{6} m
Mean radius of the Moon		1.74×10^{6} m
Mean distance—Earth to the Moon		3.84×10^{8} m
Mean distance—Earth to the Sun		1.50×10^{11} m
Electrostatic constant	k	8.99×10^{9} N•m^2/C^2
1 elementary charge	e	1.60×10^{-19} C
1 coulomb (C)		6.25×10^{18} elementary charges
1 electronvolt (eV)		1.60×10^{-19} J
Planck's constant	h	6.63×10^{-34} J•s
1 universal mass unit (u)		9.31×10^{2} MeV


X rays
Gamma Rays
10^{21} 10^{20} 10^{19} 10^{18} 10^{17} 10^{16} 10^{15} 10^{14} 10^{13} 10^{12} 10^{11} 10^{10} 10^{9} 10^{8} 10^{7} 10^{6} 10^{5}

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

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

$= \frac{\;}{q}$

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

$= \frac{\;}{I}$

$= \frac{\rho L}{A}$

$P = \;I = I^2 \; = \frac{\;^2}{\;}$

$= Pt = \;It = I^2 \; t = \frac{\;^2 t}{\;}$

A = cross-sectional area
E = electric field strength
F_e = electrostatic force
I = current
k = electrostatic constant
L = length of conductor
P = electrical power
q = charge
= resistance
$_{eq}$ = equivalent resistance
r = distance between centers
t = time
= potential difference
= work (electrical energy)
Δ = change
ρ = resistivity

Series Circuits

$I = I_1 = I_2 = I_3 = \ldots$

$= \;_1 + \;_2 + \;_3 + \ldots$

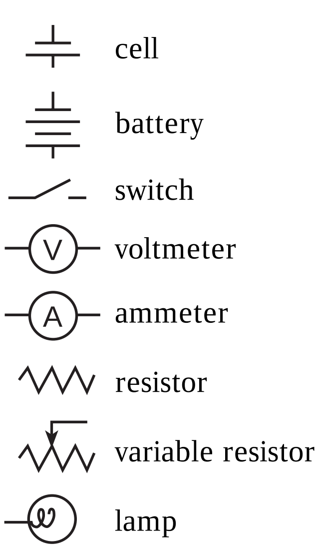
$_{eq} = \;_1 + \;_2 + \;_3 + \ldots$

Parallel Circuits

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

$= \;_1 = \;_2 = \;_3 = \ldots$

$\frac{1}{\;_{eq}} = \frac{1}{\;_1} + \frac{1}{\;_2} + \frac{1}{\;_3} + \ldots$



Resistivities at 20°C	
Material	**Resistivity** (Ω•m)
Aluminum	2.82×10^{-8}
Copper	1.72×10^{-8}
Gold	2.44×10^{-8}
Nichrome	$150. \times 10^{-8}$
Silver	1.59×10^{-8}
Tungsten	5.60×10^{-8}

$= f\lambda$

$T =$

$\theta_i = \theta_r$

$=$

$_1 \sin \theta_1 = \ _2 \sin \theta_2$

$= \quad =$

$E_{photon} = hf =$

$E_{photon} = E_i - E_f$

$E = mc^2$

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

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

$v_f = v_i + at$

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

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

$A_y = A \sin \theta$

$A_x = A \cos \theta$

$a = \frac{F_{net}}{m}$

$F_f = \mu F_N$

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

$g = \frac{F_g}{m}$

$p = mv$

$p_{before} = p_{after}$

$J = F_{net}t = \Delta p$

$F_s = kx$

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

$F_c = ma_c$

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

$\Delta PE = mg\Delta h$

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

$W = Fd = \Delta E_T$

$E_T = PE + KE + Q$

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

a = acceleration

a_c = centripetal acceleration

A = any vector quantity

d = displacement or distance

E_T = total energy

F = force

F_c = centripetal force

F_f = force of friction

F_g = weight or force due to gravity

F_N = normal force

F_{net} = net force

F_s = force on a spring

g = acceleration due to gravity or gravitational field strength

G = universal gravitational constant

h = height

J = impulse

k = spring constant

KE = kinetic energy

m = mass

p = momentum

P = power

PE = potential energy

PE_s = potential energy stored in a spring

Q = internal energy

r = radius or distance between centers

t = time interval

v = velocity or speed

$\bar{v}$ = average velocity or average speed

W = work

x = change in spring length from the equilibrium position

Δ = change

θ = angle

μ = coefficient of friction