

# Physical Constants

average gravity at surface of earth:  $g = 9.8 \text{ m/s}^2$

gravitational constant:  $G = 6.67 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$

speed of light:  $c = 3.00 \times 10^8 \text{ m/s}$

Avagadro's Number:  $N = 6.02 \times 10^{23} \text{ atoms/mole}$

elementary charge:  $e = 1.60 \times 10^{-19} \text{ C}$

electron mass:  $m_e = 9.11 \times 10^{-31} \text{ kg}$

proton mass:  $m_p = 1.67 \times 10^{-27} \text{ kg}$

neutron mass:  $m_n = 1.68 \times 10^{-27} \text{ kg}$

permittivity of free space:  $\epsilon_0 = 8.85 \times 10^{-12} \text{ F/m}$

permeability of free space:  $\mu_0 = 1.26 \times 10^{-6} \text{ H/m}$

$1/(4\pi\epsilon_0) = 8.99 \times 10^9 \text{ Nm}^2/\text{C}^2$

gas constant:  $R = 8.31 \text{ J/mol.K}$

Plank's constant:  $h = 6.63 \times 10^{-34} \text{ J/mol.K}$

Boltzmann constant:  $k = 1.38 \times 10^{-23} \text{ J/K}$

average distance from earth to moon:  $3.82 \times 10^8 \text{ m}$

average distance from earth to sun:  $1.5 \times 10^{11} \text{ m}$

mass of earth:  $5.98 \times 10^{24} \text{ kg}$

mass of moon:  $7.36 \times 10^{22} \text{ kg}$

mass of sun:  $1.99 \times 10^{30} \text{ kg}$

radius of earth:  $6.37 \times 10^6 \text{ m}$

radius of moon:  $1.74 \times 10^6 \text{ m}$

radius of sun:  $6.96 \times 10^8 \text{ m}$

# Conversions

## Length

$$1 \text{ foot} = 0.3048 \text{ meters}$$

$$1 \text{ mile} = 1609 \text{ meters}$$

## Angles

$$1 \text{ radian} = 57.3 \text{ degrees}$$

## Speed

$$1 \text{ m/s} = 2.237 \text{ miles per hour}$$

$$1 \text{ mile per hour} = 1.467 \text{ ft/s}$$

## Force

$$1 \text{ N} = 0.2248 \text{ lb}$$

## Pressure

$$1 \text{ atm} = 760 \text{ mm Hg}$$

$$1 \text{ atm} = 1.013 \times 10^5 \text{ Pa}$$

$$1 \text{ atm} = 14.70 \text{ lb/ft}^2$$

## Energy

$$1 \text{ J} = 0.7376 \text{ ft.lbs}$$

$$1 \text{ J} = 0.2389 \text{ cal}$$

$$1 \text{ J} = 2.778 \times 10^{-7} \text{ kW.hr}$$

$$1 \text{ J} = 2.613 \times 10^{19} \text{ eV}$$

## Power

$$1 \text{ W} = 1.341 \times 10^{-3} \text{ hp}$$

