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Abstract

Deakin Uni Physics for the Life Sciences Notes

1 Constants

$$
\begin{aligned}
c &= 3.00 \times 10^{9}\ m/sec \\
e &= 1.80 \times 10^{-19}\ C \\
g &= 9.8\ m/sec^2 \\
1\text{ atm} &= 1.01 \times 10^{5} Pa = 760\ mmHg \\
\text{Coulomb's } K &= 9 \times 10^{9}\ Nm^2C^{-2} \\
\text{Speed of Sound} &= 343\ m/sec \\
1\text{Cal} &= 4.186\ J \\
1\text{eV} &= 1.60 \times 10^{-}19\ J \\
\text{Electron Mass} &= 9.11 \times 10^{-31}\ Kg \\
\text{Proton Mass} &= 1.67 \times 10^{-17}\ Kg \\
\text{Atomic Mass Unit} &= 1.67 \times 10^{-17}\ Kg \\
\epsilon_0 &= 8.85 \times 10^{-12}\ C^2/Nm^2 \\
R &= 6.31\ J/Mol - K \\
\text{Threshold of hearing} &= l_0 = 1.0 \times 10^{-12}\ W/m^2 \\
1\text{ curie} &= 3.7 \times 10^{10}\ Bq \\
k_g &= 1.38 \times 10^{-23}\ J/K \\
R &= 8.31\ J/mol - K \\
\text{Speed of Light} &= 3.0 \times 10^{8}\ m/sec \\
\hbar &= 1.05 \times 10^{-34}\ J * s = 6.58 \times 10^{-18}\ eV * s \\
\text{Density of Water} &= 1000\ kg/m^3
\end{aligned}
$$

2 Conversion Formulae

$$T = T_c + 273$$
$$T(^\circ C) = \frac{5}{9}[T(^\circ F) - 32^\circ]$$
$$n = \frac{M \text{ (in grams)}}{M_{mol}} = \frac{N}{N_A}$$

2.1 Trigonometry

$$cosine = \frac{adjacent}{hypotenuse}$$
$$sine = \frac{opposite}{hypotenuse}$$
$$tangent = \frac{opposite}{adjacent}$$

2.2 Pythagorean Theorem

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

3 Kinemetica

Kinetic Energy:	$K = \frac{1}{2}mv^2$
Gravitational Potential Energy:	$U_g =$
Spring Potential Energy:	$U_x = \frac{1}{2}kx^2$
Work:	$W = Fd(cos\theta)$
Power:	$P = \frac{\Delta E}{\Delta t}$
Mechanical Power:	$P = \frac{W}{\Delta t} = F\nu$
Energy Efficiency:	$e = \frac{E_{out}}{E_{in}}$

3.1 Thermal Properties

$$T = \frac{2}{3}\frac{K_{avg}}{k_b}$$

Thermal expansion (volume): $\Delta V = \beta V, \Delta T$

Thermal expansion (linear): $\Delta L = \alpha L, \Delta T$