Physics Reference Sheet

Formulas

Average Speed: $v = \frac{\Delta x}{\Delta t}$

Uniformly Accelerated Motion: $v = v_o + at$

$$x = x_o + v_o t + \frac{1}{2} at^2$$

Newton's Second Law: $F = ma$

Centripetal Force: $F = \frac{mv^2}{r}$

Law of Universal Gravitation: $F = \frac{Gm_1m_2}{r^2}$

Force Due to Gravity: $F = w = mg$

Work: $W = Fd$

Kinetic Energy: $E = \frac{1}{2} mv^2$

Gravitational Potential Energy: $E = mgh$

Momentum: $p = mv$

Collision in One Dimension: $[m_1v_1 + m_2v_2]_{initial} = [m_1v_1 + m_2v_2]_{final}$

Heat Energy: $Q = mc\Delta T$

First Law of Thermodynamics: $\Delta U = Q + W_{(on\ the\ system)}$

$$\Delta U = Q - W_{(by\ the\ system)}$$

Work by a Heat Engine: $W = Q_H - Q_L$

Change in Entropy: $\Delta S = \frac{Q}{T}$

Wave Speed: $v = f\lambda$

Current: $I = \frac{q}{t}$

Ohm's Law: $V = IR$

Power Dissipated in a DC Circuit: $P = IV$

Power Dissipated in a Resistor: $P = I^2R$

Units

Force: $1\ \text{N} = 1\ \frac{\text{kg m}}{\text{s}^2}$

Energy: $1\ \text{J} = 1\ \text{N m}$

Power: $1\ \text{W} = 1\ \frac{\text{J}}{\text{s}}$

Constants

Gravitational Constant: $G = 6.67 \times 10^{-11}\ \frac{\text{N m}^2}{\text{kg}^2}$

Acceleration Due to Gravity: $g = 9.8\ \frac{\text{m}}{\text{s}^2}$

Speed of Light in a Vacuum: $c = 3.00 \times 10^8\ \frac{\text{m}}{\text{s}}$