# Constants

## Conversions

## Basic Formulas

# Force and Energy

## Newton’s Law

|  |  |
| --- | --- |
|  |  |

|  |  |  |
| --- | --- | --- |
|  | Force | Energy |
|  |  |  |
| Gravity (on earth) |  |  |
| Gravity (in space) |  |  |
| Spring |  |  |
| External Force |  |  |
| Kinetic Friction |  |  |
| Drag |  |  |
| Buoyancy |  |  |
| Electric |  |  |
| Magnetic |  |  |
| Magnetic |  |  |
| Normal Force |  |  |
| Tension |  |  |
| Static Friction |  |  |
| Kinetic Energy |  |  |
| Rotational Kinetic |  |  |
| Chemical Energy |  |  |
| Thermal Energy |  |  |

# Kinematics

## Circular Motion

# Rotational Motion

## Moments of Inertia

## Rolling

# Momentum and Energy

## Conservation Laws

# Fluids

(fluid not moving)

# Oscillations and Waves

## General Oscillations

## General Waves

## Specific Examples

## Sound

# Thermodynamics

## Laws

## Heat

# Basic Equ. of Electricity and magnetism

## Maxwell’s Equations

## Potential and Fields

## Other

# Fields

## Sources

## Dipoles

## Induction

# Circuits

## Components

## Kirchhoff’s Laws

|  |  |  |  |
| --- | --- | --- | --- |
| Component |  | Sign | Energy |
| Battery |  |  |  |
| Capacitor |  |  |  |
| Resistor |  | drops going with |  |
| Inductor |  | drops going with |  |

## AC Circuits

## Combination Rules

|  |  |  |
| --- | --- | --- |
| Capacitors | Add | Const |
| Series |  |  |
| Parallel |  |  |
| **Resistors** | **Add** | **Const** |
| Series |  |  |
| Parallel |  |  |
| **Inductors** | **Add** | **Const** |
| Series |  |  |
| Parallel |  |  |

## Time-dependent Circuits

|  |  |  |
| --- | --- | --- |
| RC Circuits |  |  |
| Charging |  |  |
| Discharging |  |
| **LR Circuits** |  |  |
| Ramping up |  |  |
| Ramping down |  |  |
| **LC Circuits** |  |  |
| Oscillating |  |  |

# Wave Optics

## Electromagnetic Waves

## Interference

## Diffraction

# Geometric Optics

|  |  |  |
| --- | --- | --- |
| Quantity | Positive when | Negative when |
|  | Object in front | Object behind |
|  | Image where light is (real) | Image not where light is (virtual) |
|  | Converging lens, concave mirror | Diverging lens, convex mirror |
|  | Upright | Inverted |