

ADVANCED PLACEMENT PHYSICS 1 TABLE OF INFORMATION, EFFECTIVE 2015

CONSTANTS AND CONVERSION FACTORS

Proton mass, $m_p = 1.67 \times 10^{-27}$ kg	Electron charge magnitude, $e = 1.60 \times 10^{-19}$ C
Neutron mass, $m_n = 1.67 \times 10^{-27}$ kg	Coulomb's law constant, $k = 1/4\pi\epsilon_0 = 9.0 \times 10^9$ N·m ² /C ²
Electron mass, $m_e = 9.11 \times 10^{-31}$ kg	Universal gravitational constant, $G = 6.67 \times 10^{-11}$ m ³ /kg·s ²
Speed of light, $c = 3.00 \times 10^8$ m/s	Acceleration due to gravity at Earth's surface, $g = 9.8$ m/s ²

MECHANICS

$v_x = v_{x0} + a_x t$	a = acceleration
$x = x_0 + v_{x0} t + \frac{1}{2} a_x t^2$	d = distance
$v_x^2 = v_{x0}^2 + 2a_x(x - x_0)$	E = energy
$\vec{a} = \frac{\sum \vec{F}}{m} = \frac{\vec{F}_{net}}{m}$	f = frequency
$ \vec{F}_f \leq \mu \vec{F}_n $	F = force
$a_c = \frac{v^2}{r}$	h = height
$\vec{p} = m\vec{v}$	I = rotational inertia
$\Delta\vec{p} = \vec{F} \Delta t$	K = kinetic energy
$K = \frac{1}{2} m v^2$	k = spring constant
$\Delta E = W = F_{\parallel} d = F d \cos \theta$	L = angular momentum
$P = \frac{\Delta E}{\Delta t}$	ℓ = length
$\theta = \theta_0 + \omega_0 t + \frac{1}{2} \alpha t^2$	m = mass
$\omega = \omega_0 + \alpha t$	P = power
$x = A \cos(2\pi f t)$	p = momentum
$\vec{a} = \frac{\sum \vec{\tau}}{I} = \frac{\vec{\tau}_{net}}{I}$	r = radius or separation
$\tau = r_{\perp} F = r F \sin \theta$	T = period
$L = I\omega$	t = time
$\Delta L = \tau \Delta t$	U = potential energy
$K = \frac{1}{2} I \omega^2$	V = volume
$ \vec{F}_s = k \vec{x} $	v = speed
$U_s = \frac{1}{2} k x^2$	W = work done on a system
$\rho = \frac{m}{V}$	x = position
	α = angular acceleration
	μ = coefficient of friction
	θ = angle
	ρ = density
	τ = torque
	ω = angular speed
	$\Delta U_g = m g \Delta y$
	$T = \frac{2\pi}{\omega} = \frac{1}{f}$
	$T_s = 2\pi \sqrt{\frac{m}{k}}$
	$T_p = 2\pi \sqrt{\frac{\ell}{g}}$
	$ \vec{F}_g = G \frac{m_1 m_2}{r^2}$
	$\vec{g} = \frac{\vec{F}_g}{m}$
	$U_G = -\frac{G m_1 m_2}{r}$

ELECTRICITY

$ \vec{F}_E = k \frac{ q_1 q_2 }{r^2}$	A = area
$I = \frac{\Delta q}{\Delta t}$	F = force
$R = \frac{\rho \ell}{A}$	I = current
$I = \frac{\Delta V}{R}$	ℓ = length
$P = I \Delta V$	P = power
$R_s = \sum_i R_i$	q = charge
$\frac{1}{R_p} = \sum_i \frac{1}{R_i}$	R = resistance
	r = separation
	t = time
	V = electric potential
	ρ = resistivity

WAVES

$\lambda = \frac{v}{f}$	f = frequency
	v = speed
	λ = wavelength

GEOMETRY AND TRIGONOMETRY

Rectangle $A = bh$	A = area
Triangle $A = \frac{1}{2} bh$	C = circumference
Circle $A = \pi r^2$ $C = 2\pi r$	V = volume
Rectangular solid $V = \ell wh$	S = surface area
Cylinder $V = \pi r^2 \ell$ $S = 2\pi r \ell + 2\pi r^2$	b = base
Sphere $V = \frac{4}{3} \pi r^3$ $S = 4\pi r^2$	h = height
	ℓ = length
	w = width
	r = radius
	Right triangle $c^2 = a^2 + b^2$
	$\sin \theta = \frac{a}{c}$
	$\cos \theta = \frac{b}{c}$
	$\tan \theta = \frac{a}{b}$

