Equations of motion formula sheet

Continue

Energy

Kinetic Energy

$$E_K = \frac{1}{2}mv^2$$

E_K = Kinetic Energy (J)
m = mass (kg)
v = velocity (ms^{-1})

Gravitational Potential Energy

$$E_P = mgh$$

E_P = Potential Energy (J)
m = mass (kg)
g = gravitational acceleration (ms^{-2})
h = height (m)

Elastic Potential Energy

$$E_P = \frac{1}{2}kx^2$$

E_P = Potential Energy (J)
k = spring constant ($N m^{-1}$)
x = extension of spring (m)

$$E_P = \frac{1}{2}Fx$$

F = Force (N)

ADVANCED PLACEMENT PHYSICS B EQUATIONS

FLUID MECHANICS AND THERMAL PHYSICS

$p = p_0 + \rho gh$
$F_{buoy} = \rho Vg$
$A_1 v_1 = A_2 v_2$
$p + \rho gy + \frac{1}{2}\rho v^2 = \text{const.}$
$\Delta \ell = \alpha \ell_0 \Delta T$
$Q = mL$
$Q = mc\Delta T$
$p = \frac{F}{A}$
$pV = nRT$
$K_{avg} = \frac{3}{2}k_B T$
$v_{rms} = \sqrt{\frac{3RT}{M}} = \sqrt{\frac{3k_B T}{\mu}}$
$W = -p\Delta V$
$Q = nc\Delta T$
$\Delta U = Q + W$
$\Delta U = nc_V \Delta T$
$e = \left|\frac{W}{Q_H}\right|$
$e_c = \frac{T_H - T_C}{T_H}$

A = area
c = specific heat or molar specific heat
e = efficiency
F = force
h = depth
K_{avg} = average molecular kinetic energy
L = heat of transformation
ℓ = length
M = molecular mass
m = mass of sample
n = number of moles
p = pressure
Q = heat transferred to a system
T = temperature
U = internal energy
V = volume
v = velocity or speed
v_{rms} = root-mean-square velocity
W = work done on a system
y = height
α = coefficient of linear expansion
μ = mass of molecule
ρ = density

WAVES AND OPTICS

$v = f\lambda$
$n = \frac{c}{v}$
$n_1 \sin \theta_1 = n_2 \sin \theta_2$
$\sin \theta_c = \frac{n_2}{n_1}$
$\frac{1}{s_i} + \frac{1}{s_0} = \frac{1}{f}$
$M = \frac{h_i}{h_0} = -\frac{s_i}{s_0}$
$f = \frac{R}{2}$
$d \sin \theta = m\lambda$
$x_m \approx \frac{m\lambda L}{d}$

d = separation
f = frequency or focal length
h = height
L = distance
M = magnification
m = an integer
n = index of refraction
R = radius of curvature
s = distance
v = speed
x = position
λ = wavelength
θ = angle

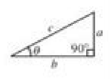
ATOMIC AND NUCLEAR PHYSICS

$E = hf = pc$
$K_{max} = hf - \phi$
$\lambda = \frac{h}{p}$
$\Delta E = (\Delta m)c^2$

E = energy
f = frequency
K = kinetic energy
m = mass
p = momentum
λ = wavelength
ϕ = work function

GEOMETRY AND TRIGONOMETRY

Rectangle
$A = bh$
Triangle
$A = \frac{1}{2}bh$
Circle
$A = \pi r^2$
$C = 2\pi r$
Parallelepiped
$V = \ell wh$
Cylinder
$V = \pi r^2 \ell$
$S = 2\pi r\ell + 2\pi r^2$
Sphere
$V = \frac{4}{3}\pi r^3$
$S = 4\pi r^2$
Right Triangle
$a^2 + b^2 = c^2$
$\sin \theta = \frac{a}{c}$
$\cos \theta = \frac{b}{c}$
$\tan \theta = \frac{a}{b}$



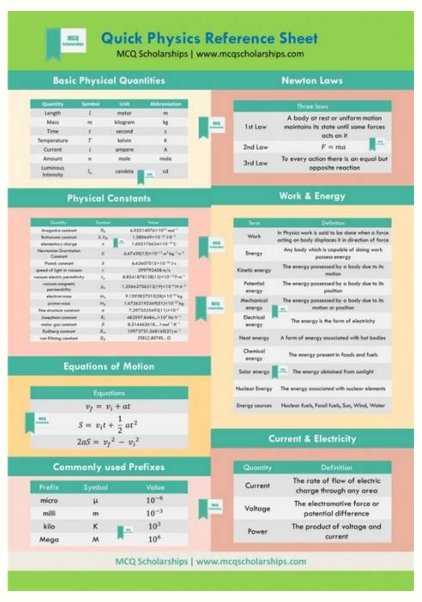
A = area
C = circumference
V = volume
S = surface area
b = base
h = height
ℓ = length
w = width
r = radius

$$d = v_i * t + \frac{1}{2} * a * t^2$$

$$v_f = v_i + a * t$$

$$v_f^2 = v_i^2 + 2 * a * d$$

d = displacement a = acceleration t = time
v_f = final velocity v_i = initial velocity



$$0 = -16t^2 + 40t + 1.5$$

**The height of the ball is 0ft since it's on the ground.

Since the equation is set equal to 0, we can solve Using the quadratic formula.

where: a = -16 b = 40 c = 1.5

Formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$$x = \frac{-40 \pm \sqrt{40^2 - 4(-16)(1.5)}}{2(-16)}$$

$$x = \frac{-40 \pm \sqrt{1696}}{-32}$$

$$x = \frac{-40 + \sqrt{1696}}{-32} \quad \text{or} \quad x = \frac{-40 - \sqrt{1696}}{-32}$$

x = -.037 **x = 2.54**

The ball landed on the ground in 2.54 seconds.

4th equation of motion formula. Formula for motion. How to calculate equation of motion. First equation of motion formula.

Home » Physics Equation Sheet The understanding of concepts in Physics is a basic block without which you are nowhere.Often when one understands that the theories thoroughly, we see that they can easily discover the relation between the quantities by which they can construct the formulas that generally derive it and learning for them will be simple.The questions which are in the subject physics are something which challenges your skills and physics knowledge as well. These are grounded on three things:To examine what is provided and what is asked in the numerical.Next is the making use of the correct formula.Filling in the values and computing properly.To crack all these kinds of challenges which are in the form of questions one needs to have a proper understanding of the subject of Physics formulae as well as its concepts.Here, provided all physics formulas in a simple format in our effort to create a repository where a scholar can get hold of any sought after formulas.Important Physics FormulasPlanck constant h = 6.63 × 10−34 J.s = 4.136 × 10-15 eV.sGravitation constant G = 6.67×10−11 m3 kg−1 s−2Boltzmann constant k = 1.38 × 10−23 J/KMolar gas constant R = 8.314 J/(mol K)Avogadro's number NA = 6.023 × 1023 mol−1Charge of electron e = 1.602 × 10−19 CPermittivity of vacuum 0 = 8.85 × 10−12 F/mCoulomb constant 1/4πε0 = 8.9875517923(14) × 109 N m2/C2Faraday constant F = 96485 C/molMass of electron me = 9.1 × 10−31 kgMass of proton mp = 1.6726 × 10−27 kgMass of neutron mn = 1.6749 × 10−27 kgStefan-Boltzmann constant σ = 5.67 × 10−8 W/(m2 K4)Rydberg constant R∞ = 1.097 × 107 m−1Bohr magneton μB = 9.27 × 10−24 J/T Bohr radius a0 = 0.529 × 10−10 m Standard atmosphere atm = 1.01325 × 105 Pa Wien displacement constant b = 2.9 × 10−3 m K .Wave = Δx Δt wave = average velocity Δx = displacement Δt = elapsed time.Vavg = (vi + vf*)2Vavg = The average velocity vi = initial velocity vf = final velocity that is another definition of the average velocity which works where letter a is constant.A = acceleration Δv = change in velocity Δt = elapsed time.Δx = the displacement vi = the initial velocity Δt = the elapsed time a = the acceleration Use this formula when you don't have vf. Δx = displacement vf = is the final velocity Δt = elapsed time a = acceleration Use this formula when you don't have vi.F = force m = mass Then a = acceleration Newton's Second Law. F is the net force on the mass m. W = weight m = mass g = acceleration which is due to gravity.Then we see that the weight of an object with mass m. This is said to be really just Newton's Second Law. f = μN f = friction force μ = coefficient of friction N = normal force Here μ can be either the kinetic coefficient of friction μk or the static coefficient of friction. p = mvW = F d cos θ or W = F!d W = work tF = force d = distance θ = angle between F and the direction of motion KE = kinetic energym = massv = velocityPE = potential energy m = mass g = acceleration due to gravity h = heightW = work done KE = kinetic energy. The "work-energy" which we have learnt is the theorem that is the work done by the net force on an object equals the change in kinetic energy of the object. We can write it as E = KE + PE E = total energyKE = kinetic energyPE = potential energyW = workΔt = elapsed timePower is the amount of work which is done per unit time that is power is the rate at which work is done. If you're seeing this message, it means we're having trouble loading external resources on our website. If you're behind a web filter, please make sure that the domains *.kastatic.org and *.kasandbox.org are unblocked.

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