Equations for Physics

**elastic potential energy**

**kinetic energy gravitational potential energy of a spring**

  

**mechanical energy work by a force work by friction work by gravity**

   

 **power when a force moves an object**

**work on system power at constant speed in a straight line**

  

**Newton’s Second Law force of friction force of a spring weight on earth**

    

**momentum impulse**

    

**equations of accelerated motion**

   

  

**definition of NET force definition of work on an object**

** **works by forces = *ΔKE* of the object

**centripetal acceleration centripetal force**

  

**Newton’s law of gravitation acceleration due to gravity**

 

Physical Constants

acceleration due to gravity: *g* = 9.8 m/s2

gravitational constant: *G* = 6.67 X 10 -11 

**general waves**

$V=λf$$D=Vt$$f=\frac{1}{T}$$\frac{λ\_{1}}{V\_{1}}=\frac{λ\_{2}}{V\_{2}}$

**light waves**

 **index of refraction Snell’s law critical angle**

$n=\frac{c}{V}$$n\_{1}\sin(θ\_{1})= n\_{2}\sin(θ\_{2})$$θ\_{critical}=sin^{-1}\frac{n\_{into}}{n\_{leaving}}$

**index of refraction and wavelength**

$n\_{1}λ\_{1}=n\_{2}λ\_{2}$

**mirrors & lenses**

$\frac{1}{f}=\frac{1}{d\_{o}}+\frac{1}{d\_{i}}$ OR $f=(d\_{o}^{-1}+d\_{i}^{-1})^{-1}$$\left|\frac{d\_{i}}{d\_{o}}\right|=\left|\frac{h\_{i}}{h\_{o}}\right|$= *magnification*

**electric circuits**

 **Ohm’s law resistors in series**

$V=IR$$I\_{source}=\frac{V\_{source}}{R\_{circuit}}$$R\_{combined}=R\_{1}+R\_{2}+ \cdots $

**electrical power resistors in parallel**

$P=VI or P=I^{2}R or P=\frac{V^{2}}{R}$$R\_{combined}=\left(R\_{1}^{-1}+R\_{2}^{-1}+ \cdots \right)^{-1}$

**electric fields**

 **Coulomb’s law electric field strength**

$F=\frac{kQ\_{1}Q\_{2}}{d^{2}}$$E=\frac{F}{q}$OR $E=\frac{V}{D}$OR $E=\frac{kQ}{d^{2}}$

**charged particle moving in an electric field**

$W=qV$OR $W=qED$AND $W=∆KE\_{particle}$

**physical constants**

**speed of light in vacuum or air: *c* = 3 X 108 m/s**

**index of refraction of vacuum or air: *n* = 1**

**fundamental electric charge: *e* = 1.6 X 10 -19 C**

**Coulomb’s law constant:** $k=9x10^{9 }\frac{N∙m^{2}}{C^{2}}$