Formula Sheet

**Energy, Work, Power**

**& Heat**

W=Fd or W=ΔE

PE=mgh

KE= ½ mv2

P=W/t

P=FV

PEs= ½ kx2

PEi+ KEi=PEf + KEf

Q=mcΔT

**Forces**

* Fnet=ma
* Ff=μFn  (Fn=Fg on level surface)
* Fg=mg
* Fs=kx

Fnet=net force Ff=force of friction Fg=force of gravity

M=mass μ=coefficient of friction Fs=force of spring

A=acceleration Fn=Normal force

**Momentum**

* p=mV
* Δp=mΔV or Δp=m(Vf-Vi)
* Δp=FΔt
* FΔt=m(Vf-Vi)
* pi=pf

Elastic

* + m1V1i + m2V2i= m1V1f + m2V2f

Inelastic

* + m1V1i + m2V2i= (m1 + m2)Vf

W=work or ΔE PEs=Spring PE

F=force (or elastic PE)

d=distance k=spring

PE=potential energy constant

m=mass x=distance

g=9.8 m/s2  compressed

h=height or stretched

KE=kinetic energy q=heat

P=power c=specific heat

t=time ΔT= Tf-Ti

V=velocity (T=temperature)

Vt=tangential velocity

T=period

Fg=force of gravity

G=gravitation constant

**Circular Motion and Gravity**

* Vt=(2πr)/T r=radius
* Ac=(Vt)2/r r=radius
* Fc=mac
* Fg=(Gm1m2)/r2 r=distance\*\*
* G=6.67 x 10-11 N (m/kg)2

Vf=Final Velocity a=acceleration

Vi=Initial Velocity Δt=time

Δx=displacement (or distance)

**Motion**

* V f = V i + at
* Δx = V i Δt + ½ (a t2)
* Vf2 = Vi2 + 2 a Δx
* Δx = ½ (Vf + Vi) Δt

Trigonometry

A2 + B2 = C2

Cosθ=A/H

Sinθ=O/H

Tanθ=O/A

p=momentum Δp=change in momentum

m=mass or impulse

V=velocity F=force

**Electricity**

Fe=kq1q2  E=Fe/q E=kq/r2

r2

k=9.0 x 109 Nm2/C2

I=q P=IV V=IR W=Pt W=ΔE

t

f=focal point

di=distance of image from

mirror/lens

do=distance of object from

mirror/lens

hi= height of image

ho= height of object

**Lenses and Mirrors**

1 =1 +1

f di do

hi = - di

ho do

Fs=spring force

k=spring constant

x=distance compressed or stretched

PEs=spring or elastic potential

Energy

f=frequency

T=period

**Springs and Harmonic Motion**

Fs=kx

PEs= ½ kx2

f=1/T

T=1/f

Fe=electric Force P=power

k=Coulomb’s constant V=Voltage

q=charge R=resistance

r=distance W=work or electric

energy

E=Electric Field Strength

t=time

f=frequency

T=period

v=velocity

λ=wavelength

c=speed of light

n=index of refraction

θi=angle of incidence

θr=angle of refraction

c=speed of light

v=velocity in new medium

**Waves/Light**

f=1/T

T=1/f

v=λf

c=3.0 x 108 m/s

nsinθi =nsinθr

n=c/v