**Variables**

***X*** indicates a vector

X indicates a scalar

A = area

***a*** = acceleration

C = specific heat

e = efficiency

***F*** = force

f = frequency

g = grav. acceleration

h = height/depth

I = moment of inertia

I = sound intensity

K = kinetic energy

k = spring constant

L = latent heat

l = length

m = mass

***p*** = momentum

P = power

p = pressure

Q = heat

r = radius

T = period

T = temperature

t = time

U = potential energy

V = volume

***v*** = velocity

W = work

***x, y*** = position

***α*** = angular acceleration

$β$ = sound (in Decibels)

ρ = density

$τ$= torque

***ω*** = angular velocity

**Kinematics**

***x***(t)=***x0***+***v0***t+$\frac{1}{2}$***a***t2

***v***(t)=***v***0+***a***t

***vf***2=***v0***2+2***a***(***Δx***)

$$F\_{f}=μF\_{n}$$

$$∑F=ma$$

$$a\_{c}=\frac{v^{2}}{r}$$

***F*** = -k***Δx***

$F\_{g} = \frac{-Gm\_{1}m\_{2} }{r^{2}}$ $r̂$

***p***=m***v***

m1***v1*** = m2***v2***

**Work, Energy, and Power**

K0 + U0 + WNC = Kf + Uf

K=$\frac{1}{2}$m***v***2



U = mgh

Pavg = $\frac{∆W}{∆t}$

**Rotational Motion**

$$I=∑mr^{2}$$

***v***=r***ω***

K=$\frac{1}{2}Iω^{2}$

***a***=r***α***

$$τ=Iα=r x F$$

[Linear motion equations can be translated into rotational motion equations by substituting ***α*** for ***a***, ***ω*** for ***v***, ***θ*** for ***x***, and I for m.]

**Oscillations, Waves, and Fluids**

***ω***=$\frac{2π}{T}$=$2πf$

$T=2π\sqrt{\frac{m}{k}}$ = $2π\sqrt{\frac{l}{g}}$ = $\frac{1}{f}$

p +$ \frac{1}{2}$ρ***v***2 + ρgh =constant

p = $\frac{F}{A}$

ρ1A1***v1*** = ρ2A2***v2***

y=Asin(k***x***-***ω***t)

$$β=10log⁡(\frac{I}{I\_{0}})$$

**Thermodynamics**

$$\frac{∆l}{l}=α∆T$$

$$\frac{∆V}{V}=β∆T$$

Q = mC$∆T$

Q = mL

eCarnot = 1 - $\frac{T\_{c}}{T\_{H}}$

K = $\frac{3}{2}kT$

