wavelength = c/f

f = 1/T

a = v/t

momentum = mv

Kinetic Energy ke = 1/2 mv^2

centrifugal/centripetal force: F = mv^2/r

Force = Mass * acceleration

Work = force * distance moved unit: newton meter or joule or Work = Mass * Gravity * Height

Work = Change in Energy

Power = work / time = force * displacement / time = force * velocity

Power (hp,watt) = work(ENERGY)/time aka time rate of energy transfer

Energy = Power x Time

XL= 2πfL

I= V/XL Alternating current flowing through inductor is applied voltage / inductive reactance

XC= -1/2πfC

Z = sqrt(R^2 + $(Xc - Xl)^2$)

I = (V-E)/Z current through transformer primary E = voltage drop across primary inductance

F = 1/6.2832√LC

F = 1/2π√LC

C= $1/4\pi^2 Fr^2 L$

Fl = R/2πL cutoff frequency of RL low pass filter

Fc = 1/2πRC cutoff frequency of RC low pass filter

ohms law: V = IR

power per second:

P = IV

P = I^2R copper losses

P = V^2/R

P=VI*PF true power (V and I are average, RMS)

energy stored in an inductor E = $LI^2/2$

energy stored in an cap E = 1/2 QV = $Q^2/2C$ = $CV^2/2$

for capacitor and inductor circuit V=IZ

for capacitor circuit V=C*(dv/dt)*R

I = C dv/dt current through a cap

1 Volt = 1 Joule/Coulomb

1 Watt = 1 Joule/Second

1 Ampere = 1 Coulomb/Second

$V \times A = J/C \times C/s = J/s =$ Watt

electric energy $E = IVt$ and $E = (V^2/R)t$

1F = 1C / 1V - amount of electric charge in coulombs that is stored per 1 volt

$C = Q / V$ and $C = kA/d$

$E = F / Q$ electric field (N/C or V/m) is force per charge

$F = qE + qv \times B$ lorentz law, em forces on a charge

R = 80*pi^2*(L/W)^2 rad. res. of antenna where L=length of antenna, and W = wavelength

t = L/R inductor time constant, after 5t (transient time) current reaches 99.5%

t = RC for RC circuit, after 5RC cap is 99.5% charged

capacitor full discharge time is also 5t

transformer size is proportional to B MAX =V/F

in alternator emf leads flux by 90°+

energy content of wave is proportional to the amplitude squared $P = E^2$

Z = sqrt(L / C) cable characteristic impedance

reactive load temporary stores energy, not waste it (unless PS cant take it back)

v = L(di/dt) BACKEMF from an inductor

Short circuit current = V / alternator internal resistance

$V=-N*d\Phi/dt$ voltage farraday's law

V = BLv farraday law for moving conductor

flux density = amper x turns x core permeability x core area / m^2 (T)

F = ILxB force on a conductor in a magnetic field - laplace

as load increases, current in the conductor must increase to balance the forces: I = F/BL

free space impedence 376Ohm

C = 1 / sqrt permitivity x permeability of space

Q = XL/R