Equations

$$D.T. = \frac{70}{\%growth}$$

$$a = \frac{\mathbf{F}_{net}}{m}$$

$$\mathbf{F}_{net} = m\mathbf{a}$$

$$W = Fd$$

$$\text{KE} = \tfrac{1}{2}mv^2$$

$$\text{PE}_{\text{grav}} = mgh$$

$$E_1 = E_2$$

$$W + Q = \Delta(\text{KE} + \text{PE} + \text{TE}) = \Delta E$$

$$\text{KE}_1 + \text{PE}_1 = \text{KE}_2 + \text{PE}_2$$

$$P = \frac{W}{t} = \frac{\Delta E}{t}$$

$$Eff = \frac{\text{Useful Energy or } W}{Energy \text{ In}}$$

$$\Delta T = \frac{Q}{mc}$$

$$\text{Q} = mc\Delta T$$

$$\text{Q} = mL$$

$$\frac{Q_c}{t} = \frac{kA(T_2 - T_1)}{\delta}$$

$$\frac{Q_c}{t} = \frac{1}{R}(A(T_2 - T_1)) = \frac{1}{R}(A\Delta T)$$

$$\frac{Q_{\text{infil}}}{t} = (0.018)\,\text{x}\,V\,\text{x}\,K\text{x}\Delta T$$

$$\text{Degree Day} = \text{DD} = 65 - T_{avg}$$

$\Delta\text{T} = DD$ for heating load estimate

$$\text{E} = \text{hf}$$

$$Q_{total} = \sum\left(\frac{A}{R_{total}}\right)(24)(DD_{anual})$$

$$Carnot\ Eff = 1 - \frac{T_c}{T_H}$$

$$V = IR,\ \ R = \frac{V}{I},\ \ \text{I} = \frac{\text{V}}{\text{R}}$$

$$P = IV = I^2R$$

$$\frac{N_P}{N_s} = \frac{V_p}{V_S}$$

$$P = 2.83 * 10^{-4} D^2 v^3 \text{ kW (D in m, v in m/s)}$$

$$P = .0006v^3\ \frac{\text{kW}}{\text{m}^2}$$

$$c = f\lambda,\ \text{c} = 3\text{x}10^8\ \frac{m}{s}$$

$$g = 9.80\ \text{m/s}^2 = 32\text{ft/s}^2$$

$$1\text{ cm} = 10^{-2}\ \text{m D}$$

PHYS 162 Final Review

Terms to study

Absolute Zero	Energy Conservation	Heat Capacity
Exponential Growth	Conservation of Energy	Specific Heat
Doubling Time	Energy Conversion	Latent Heat
Force	Heat	R value
Work	BTU	Degree days
Energy	Joules	Infiltration
Power	Watt	Insulation
Kinetic Energy	Efficiency	Overall efficiency
Potential Energy	Conduction	Altitude
Thermal Energy	Convection	Azimuth
Total Energy	Radiation	Insolation
Nuclear Energy	Heat Transfer	Solar Constant
Fossil Fuel	Emissivity	Diffuse and Direct radiation
Electrical Energy	Laws of Thermodynamics	Greenhouse Effect

DHW	Grid	
Active Solar Energy	EMF	
Passive Solar Heating	Rated Capacity	Hydroelectric
Thermal Mass	Generator	Solar Thermal
Thermosiphoning	Cogeneration	Concentrating collector
Ohm's Law	Pumped Storage	Flat Plate Collector
Ampere	Photoelectric Effect	Trombe Wall
Pay Back Time	Photon	Series Circuit
Demand	Rated Speed	Parallel Circuit
Electrolyte	Amorphous silicon	Vertical Axis Wind Turbine
Fuel Cell	p-n junction	Horizontal Axis Wind Turbine
Green Energy	Wave/Particle Duality	Batch Water Heater
Ocean Wave Energy	Singe-crystal silicon	Ocean Thermal Energy

<u>Know the Units of the following</u>

Force: Newtons, pounds	Power: Watts, hp, ft-lb/sec	Frequency: Hertz
Energy: Joules, BTU, ft-lb	Wavelength: meters	Distance: meter, foot
Mass: Kilogram, slug	Heat: calories (other energy units)	Volt: Joule/Coulomb
Insolation: W/m^2	Ampere: 1 Coulomb/second	

<u>Know:</u>
Sketch an Active Solar Domestic Hot Water system
Skectch a Passive Hot Water System
Sketch a Passive Solar house design
The parts of a Flat Plate Solar Collector
The parts of a Photovoltaic Cell
Photovoltaic System with storage and connection to the grid
Wind Turbine system with storage and connection to the grid
Current Info on Wind Farms including environmental impacts.
Info from the Scienctific American article on Solar energy
Heat Engine diagram
Ocean Wave Energy (From OSU Info)
Review the lab exercises. And Review Homework Problems