

## Equations

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

$$\bar{v} = \frac{\Delta x}{\Delta t} = \frac{x_2 - x_1}{t_2 - t_1}, \quad \bar{a} = \frac{\Delta v}{\Delta t} = \frac{v_2 - v_1}{t_2 - t_1}$$

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

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

$$\mathbf{F}_{12} = -\mathbf{F}_{21} \text{ Action/Reaction}$$

$$W = Fd$$

$$KE = \frac{1}{2}mv^2$$

$$PE_{grav} = mgh$$

$$E_1 = E_2$$

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

$$KE_1 + PE_1 = KE_2 + PE_2$$

$$v^2 = 2gh$$

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

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

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

$$Q = mc\Delta T$$

$$Q = mL$$

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

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

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

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

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

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

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

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

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

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

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

## PHYS 162 Exam 2 Review Sheet

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	Concentrating collector
Active Solar Energy	Flat Plate Collector
Passive Solar Heating	Trombe Wall
Thermal Mass	Series Circuit
Thermosiphoning	Parallel Circuit
Ohm's Law	Batch Water Heater
Ampere	
Pay Back Time	

Know the Units of the following

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	

Know:

Sketch an Active Solar Domestic Hot Water system

Sketch a Passive Hot Water System

Sketch a Passive Solar house design

The parts of a Flat Plate Solar Collector

Review the lab exercises. And Review Homework Problems