PHYS 202 Equations Sheet

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 , for solids

α steel = α concrete = 12x10-6(Co)-1, α aluminum = 23x10-6(Co)-1, α copper = 17x10-6(Co)-1.   
Volume coefficient of expansion of radiator coolant = β = 390 x 10-6 (Co)-1.

Heat transfer:   
(Specific heat of water = 4186 J/(kg.K), Specific heat of ice = 2000 J/(kg.K), Latent heat of fusion of ice = 33.5 x 104 J/kg)

Work = Force x Distance Power = Work/TimeFirst Law of thermodynamics: ∆U = Q - W. Work = W= P.∆V  
Work done by a gas: W = P∙ΔV (Isobaric process) (Isothermal process)  
Area of a rectangle = length x width, Area of a triangle = x base x height  
Circumference, C and Area, A of a circle (radius *r*):   
Heat engines, refrigerators, and heat pumps: Coefficient of performance,   
Entropy, *S*.   
Coulomb’s law is given by: F:\PHYS202\Study Guides\sgt2CouLaw.gif Coulomb’s constant = k = 9 x 109 (SI)  
Electric current = I = Resistance, R:   
  
Ohm’s law: V = IR Electric Power = P = IV Electrical energy =IVt

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| Electric potential due to a point charge (q) at a distance r: | Electric potential in terms of EPE and point charge (q): | Electric field due to a point charge (q) at a distance r: | Electric field (E) from potential gradient: |
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Capacitors:   

Proton: charge = 1.6 x 10-19C, mass = 1.673 x 10-27kg.  
Electron: charge = -1.6 x 10-19C, mass = 9.11x10-31kg.

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| Combination | Resistors | Capacitors |
| Series |  |  |
| Parralel |  |  |

Time constant of an RC circuit = RC.

math167

math172

1. Force on a moving electric charge in a magnetic field. 

2. Force on a moving electric charge in an electric field. 

3. Centripetal force:

4. Force on a current in a magnetic field. 

5. Magnetic field produced by electric current: 

6. Faraday’s law of induction and Magnetic flux:      
7. Equations for transformers and power loss during transmission are shown below:   
  P = IV  V = IR   
8. Reactance (XC) of a capacitor, Reactance (XL) of an inductor, Impedance (Z) and resonant frequency (f0):  
  sgt3s03 resFreq  
9. Electromagnetic waves:   
10.Snell’s law:   
11. Telescope: magnification = Length: (*f0+fe)*  
12. Lens/mirror equations:**lenson1** Magnification:**lenson2**