Modern Physics for Engineers

Midterm I - Fall '99

EQUATION SHEET

Special Relativity

$$x' = \gamma(x + \beta ct) \qquad p' = \gamma(p + \beta E/c)$$

$$t' = \gamma(t + \beta x/c) \qquad E' = \gamma(E + \beta cp)$$

$$E^2 = p^2c^2 + m^2c^4 \qquad KE = E - mc^2$$

$$p_i = p_f \qquad \nu' = \nu\sqrt{\frac{1-\beta}{1+\beta}}$$

$$E_i = E_f \qquad v' = \frac{v+u}{1+uv/c^2}$$

REVIEW SHEET

Special Relativity

- Difference between Galiean and Special relativity
- Postulates of special relativity
- Time dilation
- Length contraction
- Simultaneity
- Lorentz Transforms
  - Position and time
  - Energy and momentum
  - Velocity
  - Dopler Shift
- Twin Paradox
- Conservation of energy and momentum
- Scattering/Decay problems/Compton scattering