Physics 231 - 6-Oct-99

- Collisions
  - Elastic
  - Inelastic
  - Collisions in 2-dimensions
- Center of Mass
- Circular Motion
  - Centripetal Acceleration
- quiz

Collisions

- Totally Elastic
  - $v_3 = v_1 (m_1-m_2)/(m_1+m_2) + v_2 (2m_2)/(m_1+m_2)$
  - $v_4 = v_1 (2m_1)/(m_1+m_2) + v_2 (m_2-m_1)/(m_1+m_2)$
- TotallyInelastic
  - $v_3=v_4=v$
  - Momentum conserved: $m_1v_1+m_2v_2=(m_1+m_2)v$
    $v = (m_1v_1+m_2v_2)/(m_1+m_2)$

Collisions in 2-dimensions

- Conserve momentum components

- Special case when $m_1 = m_2 = m$

Center of Mass

Circular Motion

- Angle
- Angular Velocity
- Angular Acceleration

Centripetal Force and Acceleration

- $a_c = v^2/R$

Q1 - Answer = c

Q2 - Problem A - Last name A-K

A 1000 kg car going 40 mph (18 m/s) crashes into a 3000 kg tree. In the process the tree is uprooted, lands on the car and they move off together. What is the total kinetic energy of the car and the tree?

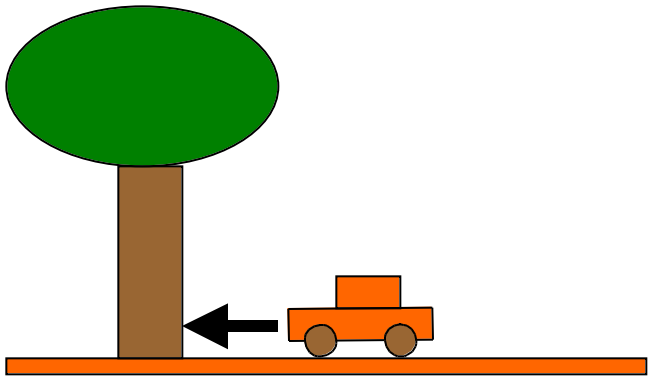
A. 40.5×10^3 J

B. 54×10^3 J

C. 16.2×10^4 J

D. 49×10^4 J

E. 18×10^3 J



Q1 - Answer = c

Q2 - Problem B - Last Name L-Z

- An 1100 kg car at rest is struck in the rear by a 2000 kg SUV going 20 m/s. As a result of the collision, the vehicles stick together and move off with the same speed. What is this final speed?

A. 20 m/s

B. 13 m/s

C. 7.1 m/s

D. 11 m/s

E. 36 m/s