Phys100 Assignment Cover Sheet

First Name:_____ Last Name: Key Mark:_____

Student ID:_____ Computing ID:_____ Date:_____

Phys100 Written Assignment #6

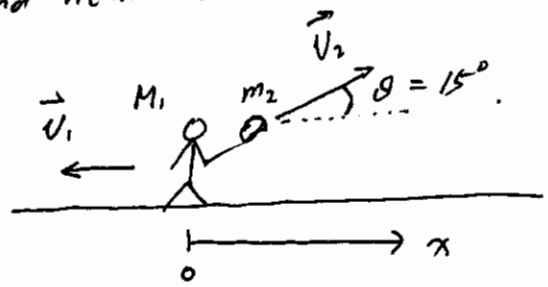
Due Wed Feb. 28, 2007, 9:00AM

A young hockey player stands at rest on the ice holding a 1.2 kg helmet. The player tosses the helmet with a speed of 6.0 m/s in a direction 15° above the horizontal, and recoils with a speed of 0.12 m/s. What is the mass of the hockey player?

[solution]. system includes the player and helmet.

∵ x-component of net external force = 0.

x-component of total momentum is conserved.



i.e., $p_{1x} + p_{2x} = \text{constant} = 0$ (since the player stands at rest first)

i.e.: $M_1 v_{1x} + m_2 v_{2x} = 0$

$$M_1 = -\frac{m_2 v_{2x}}{v_{1x}}$$

$$= -\frac{(1.2)(5.8)}{(-0.12)}$$

$$= 58 \text{ kg}.$$

$v_{2x} = v_2 \cos\theta$

$= 6 \cdot \cos 15°$

$= 5.8$ m/s

$v_{1x} = -0.12$ m/s