AP I_Chapter 9 HW (6891204)

Current Score: 0/20 Due: Fri Jan 30 2015 11:59 PM PST

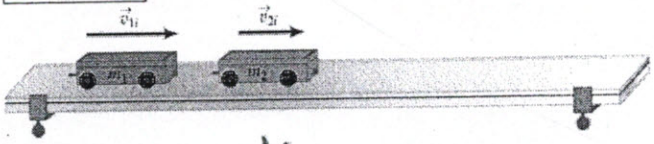
Question	1	2	3	4	5	6	7	Total
Points	0/2	0/2	0/2	0/6	0/2	0/4	0/2	0/20

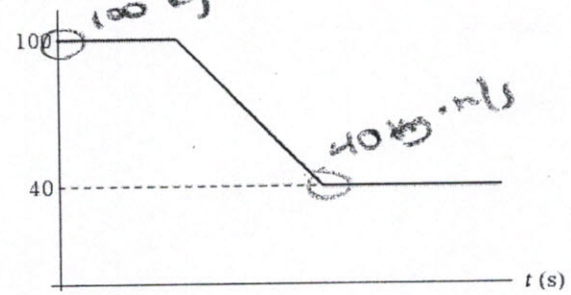
AL

1. 0/2 points KnightCPWA3 9.P.014.Tutorial. [2907608]

As shown in the figure below, cars #1 and #2 are sliding across a horizontal frictionless surface. The cars are equipped with a coupling arrangement similar to the one on railroad cars. Car #1 overtakes car #2 and they have a totally inelastic collision and become coupled together. You know the mass of each car; $m_1 = 15.5$ kg and $m_2 = 48.0$ kg. In addition, you are provided with the following graph, which shows the momentum of car #1 before, during and after the collision. Determine the velocity of car #2 before the collision.

-1.25 X m/s





100 kg·m/s

40 kg·m/s

Tutorial

$p_1 = m \cdot v$

$\frac{100 \text{ kg} \cdot \text{m/s}}{15.5} = \frac{15.5 \text{ kg}\,(v)}{15.5}$

$(v_1)_i = 6.45 \text{ m/s}$

$p_1 = p_f$

$(m_1 v_1) + (m_2 v_2) = p_f$

$(15.5 \cdot 6.45) + (48 \cdot v_2) = 40 \text{ kg} \cdot \text{m/s}$

$(99.98) + (48) v_2 = 40$

-99.98

$\frac{(48) v_2}{48} = \frac{-59.98}{48}$

$v_2 = -1.25 \text{ m/s}$

2. 0/2 points KnightCPWA3 9.P.015. [2907088]

A rubber ball with a mass of 0.170 kg is dropped from rest. From what height was the ball dropped, if the magnitude of the ball's momentum is 0.730 kg · m/s just before it lands on the ground?

.93 X m

$v_f^2 = v_i^2 + 2a(\Delta x)$

$.73 = .17\,(v)$

4.29

$v_f^2 = v_i^2 + 2a(\Delta y)$

$(4.29)^2 = 2(-9.8 \text{ m/s}^2)\,\Delta y$

$\Delta y = .93 \text{ m}$

3. 0/2 points KnightCPWA3 9.P.018. [2906889]

A member of the volleyball team spikes the ball. During this process, she changes the velocity of the ball from 3.8 m/s to −22.9 m/s along a certain direction. If the impulse she delivers to the ball is −7.0 kg · m/s, determine the mass of the volleyball.

0.262 X kg

$-7 = m(v_f) - m(v_i)$

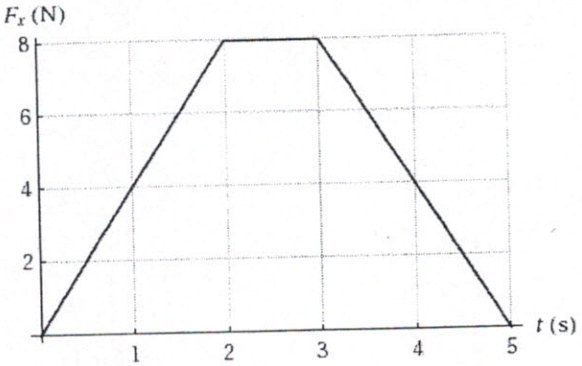
$-7 = m\,(-22.9 - 3.8)$

$m = 0.262 \text{ kg}$

KnightCPWA3 9.P.020. [2907412]

4. 0/6 points

A particle with a mass of 2.75 kg is acted on by a force F_x acting in the x-direction. If the magnitude of the force varies in time as shown in the figure below, determine the following.



(a) impulse of the force

24 ✗ kg · m/s

(b) final velocity of the particle if it is initially at rest

8.72 ✗ m/s

$24 = 2.75(v)$

8.72

(c) Find the final velocity of the particle if it is initially moving along the x-axis with a velocity of −2.00 m/s.

6.72 ✗ m/s

$24 = m(v_f) - m(v_i)$

$24 = 2.75(v_f + 2)$

6.72

KnightCPWA3 9.P.025. [2907618]

5. 0/2 points

Two ice skaters stand facing each other at rest on a frozen pond. They push off against one another and the 48-kg skater acquires a speed of 0.65 m/s. If the other skater acquires a speed of 0.88 m/s, what is her mass?

35.45 ✗ kg

$48(.65) + m(-.88)$

$31.2 + m(-.88)$

35.45

KnightCPWA3 9.P.028. [2907497]

6. 0/4 points

A 4.50-g bullet has a muzzle velocity of 260 m/s when fired by a rifle with a weight of 40.0 N.

(a) Determine the recoil speed of the rifle.

0.29 ✗ m/s

$m_1 = 0.0045$ kg

$v_1 = 260$ m/s

$m_2 = 40/9.8 = 4.1$ kg

$v_2 = ?$

$0.0045(260) = 4.1(v_2)$

$v_2 = 0.29$ m/s

(b) If a marksman with a weight of 725 N holds the rifle firmly against his shoulder, determine the recoil speed of the shooter and rifle.

0.015 ✗ m/s

$m_1 = 0.0045$

$v_1 = 260$ m/s

$m_2 = 725 + 40/9.8 = 78$ kg

$v_2 = ?$

$0.0045(260) = 78(v_2)$

$= 0.015$ m/s

KnightCPWA3 9.P.037. [2907790]

7. 0/2 points

Mary slides down a snow-covered hill on a large piece of cardboard and then slides across a frozen pond at a constant velocity of +3.0 m/s. After Mary has reached the bottom of the hill and is sliding across the ice, Sue runs after her at a velocity of +4.6 m/s and hops on the cardboard. How fast do the two of them slide across the ice together on the cardboard? Mary's mass is 70 kg and Sue's is 55 kg. Ignore the mass of the cardboard and any friction between the cardboard and the snow and/or ice. (Indicate the direction with the sign of your answer.)

3.7 ✗ m/s

$(70 \cdot 3.0) + (55 \cdot 4.6) = (70 + 55)v$

$\frac{463}{125} = \frac{(125)v}{125}$

Assignment Details

Name (AID): AP I_Chapter 9 HW (6891204)
Submissions Allowed: 5
Category: Homework
Code:

Feedback Settings

Before due date
Question Score
Assignment Score

3.7 = ✓