Assigned 01/28/15

Q 14, 20

P ~~22~~, 23, 24, 26

Q 14

The rubber ball and beanbag would start with the same momentum, but the rubberball would BOUNCE.

The rubber ball's bounce $J_{on\ pin} = -\Delta p_{projectile}$

The beanbag would move in the same direction causing it to have less impulse

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Q 20

before	after
$m_1 - 1.0\ kg$	$m_1 - 1.0\ kg$
$v_1 - 2.0\ m/s$	$v_{1+2} - 1.2\ m/s$
$m_2 - ?$	$m_2 - ?$
$v_2 -$	

A

$$m_2 = \frac{m_1 v_i - m_1 v_f}{v_f}$$

$$= \frac{(1.0\ kg)(2.0\ m/s) - (1.0\ kg)(1.2\ m/s)}{1.2\ m/s}$$

$$m_2 = 0.67\ kg$$

P. 22

Before	
$m_1 = 71\ kg$	$m_1 = 71\ kg$
$V_1 =$	
$m_2 = \cancel{140g}\ 0.140$	$m_2 = 0.140\ kg$
$V_2 = 28\ m/s$	

$$(m_1 + m_2)(V_x)_f = (m_2)(V_2)_i$$

$$(V_x)_f = \frac{m_2(V_2)_i}{(m_1 + m_2)}$$

$$= \frac{(0.140\ kg)(28\ m/s)}{71\ kg + 0.140\ kg}$$

$(V_x)_f = 5.5\ cm/s$ or $0.055\ m/s$

P 23

$m_1 - 3.0g$ 0.0030 kg	$m_1 - 0.0030kg$
$V_1 -$	$V_F - 0.30 m/s$
$m_2 - 20g$ 0.020 kg	$m_2 - 0.020 kg$
$V_2 - 0 m/s$	

$$(P_x)_i = (P_x)_f$$

$$(m_1 v_1)_i + (m_2 v_2)_i = (m_1 + m_2)_f (v_x)_f$$

$$(V_1)_i = \frac{(m_1 + m_2)(v_x)_f - (m_2 v_2)_i}{m_1}$$

$$= \frac{(0.0030kg + 0.020kg)(0.30 m/s) - (0.020kg \cdot 0 m/s)}{0.0030kg}$$

$$(V_1)_i = 2.3 m/s$$

P24

$m_1 - 2000\,kg$

$v_1 - 1\,mph$

$m_2 - 1000\,kg$

$v_2 -$

$$(P_x)_f = (P_x)_i$$

$$(m_1 + m_2)(v_x)_f = (m_1 \cdot v_1)_i + (m_2 \cdot v_2)_i = 0\ kg \cdot mph$$

$$= (2000\,kg)(1\,mph) + (1000\,kg)(v_2)_i$$

$$= -2.0\,mph$$

opposite direction

P26

★ ignore gravity ★

$m_1 - 36\,kg$

$m_2 - 47\,kg$

$v_1 - 0\,m/s$

$v_2 - 4.1\,m/s$

$v_f - ?$

$$(m_1 \cdot v_1)_i + (m_2 \cdot v_2)_i = (m_1 + m_2)(v_x)_f$$

$$= (36\,kg \cdot 0\,m/s) + (47\,kg \cdot 4.1\,m/s) = (36\,kg + 47\,kg)(v_x)_f$$

$$(v_x)_f = \frac{(47\,kg)(4.1\,m/s)}{36\,kg + 47\,kg}$$

$$(v_x)_f = 2.3\,m/s$$ upwards direction