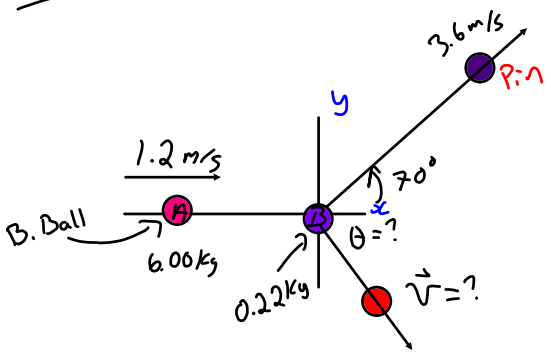
36)



x-dir

Before	After
$m_A = 6$ kg	$v_{Ax}' = ?$
$v_{Ax} = 1.2$ m/s	$v_{Bx}' = 3.6\cos 70°$
$m_B = 0.22$ kg	$= 1.23$ m/s
$v_{Bx} = 0$ m/s	

$$(6)(1.2) + 0 = (6)v_{Ax}' + (0.22)(1.23)$$

$$7.2 = 6v_{Ax}' + 0.27$$

$$1.2 \text{ m/s} = v_{Ax}'$$

y-dir

Before	After
$v_{Ay} = 0$	$v_{Ay}' = ?$
$v_{By} = 0$	$v_{By}' = 3.6\sin 70$
	$= 3.38$ m/s

$$0 = 6v_{Ay}' + (0.22)(3.38)$$

$$0 = 6v_{Ay}' + 0.74$$

$$-0.12 \text{ m/s} = v_{Ay}'$$

$$\vec{v}_A' = \sqrt{(1.2)^2 + (-0.12)^2}$$

$$= \sqrt{1.45}$$

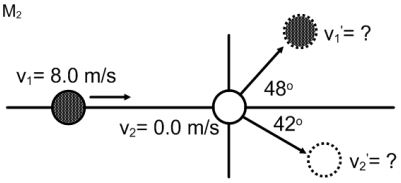
$$= 1.21 \text{ m/s}$$

$$\theta = \tan^{-1}\frac{v_{Ay}'}{v_{Ax}'} = \frac{0.12}{1.2} = 5.7°$$

$$v_A = 1.21 \text{ m/s}\ [E\ 5.7°\ S]$$

5.7° below x-axis

1) $M_1 = M_2$



Answers
$v_1' = 5.3$ m/s
$v_2' = 6.0$ m/s

x-direction

Before
$V_{1x} = 8.0 m/s$
$V_{2x} = 0 m/s$

After
$V_{1x}' = ?$
$V_{2x}' = ?$

$V_{1x}' = V_1' \cos 48$
$V_{2x}' = V_2' \cos 42$

$m_1 V_{1x} + m_2 V_{2x} = m_1 V_{1x}' + m_2 V_{2x}'$

$8.0 + 0 = V_{1x}' + V_{2x}'$ *

y-direction

Before
$V_{1y} = 0 m/s$
$V_{2y} = 0 m/s$

After
$V_{1y}' = ?$
$V_{2y}' = ?$

$0 + 0 = V_{1y}' + V_{2y}'$ *

$V_{1x}' = V_1' \cos 48$ $\quad V_{2x}' = V_2' \cos 42$

$V_{1y}' = V_1' \sin 48$ $\quad V_{2y}' = -V_2' \sin 42$

$8 = V_{1x}' + V_{2x}'$

$0 = V_{1y}' + V_{2y}'$

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① $8 = V_1' \cos 48 + V_2' \cos 42$

② $0 = V_1' \sin 48 + (-V_2' \sin 42)$

Solve ② for V_1'

$0.669 V_2' = 0.743 V_1'$

$0.90 V_2' = V_1'$ ← Sub into ①

$8 = (0.669)(0.90 V_2') + (0.743) V_2'$

$8 = 1.34 V_2'$

$5.9 m/s = V_2'$ → Solve for V_1'

$V_1' = 0.9 V_2'$
$= 0.9 (5.9)$
$= 5.4 m/s$

$V_1' = 5.4 m/s$
$V_2' = 5.9 m/s$

Attachments

collision-lab_en.jar