

9-72

| | x | y |
|--------|-------|---|
| Before | A | 2(15) 2(30) |
| | B | 2(-10) 2(5) |
| | Total | 10 70 |
| After | A | 2(-5) 2(20) |
| | B | $2V_{Bx\text{after}}$ $2V_{By\text{after}}$ |
| | Total | $-10 + 2V_{Bxa}$ $40 + 2V_{Bya}$ |

$$x: 10 = -10 + 2V_{Bxa}$$

$$\underline{\underline{10\text{m/s} = V_{Bxa}}}$$

$$y: 70 = 40 + 2V_{Bya}$$

$$\underline{\underline{15\text{m/s} = V_{Bya}}}$$

$$\begin{aligned} \text{Energy Before} &= \frac{1}{2} m_A (V_{Ax0}^2 + V_{Ay0}^2) + \frac{1}{2} m_B (V_{Bx0}^2 + V_{By0}^2) \\ &= \frac{1}{2} (2) (15^2 + 30^2) + \frac{1}{2} (2) (10^2 + 5^2) \\ &1125 + 125 \end{aligned}$$

1250 Joule

$$\begin{aligned} \text{Energy After} &= \frac{1}{2} m_A (V_{Ax\text{a}}^2 + V_{Ay\text{a}}^2) + \frac{1}{2} m_B (V_{Bx\text{a}}^2 + V_{By\text{a}}^2) \\ &= \frac{1}{2} (2) (5^2 + 20^2) + \frac{1}{2} (2) (10^2 + 15^2) \end{aligned}$$

425 + 325

750 Joule

500 Joules lost