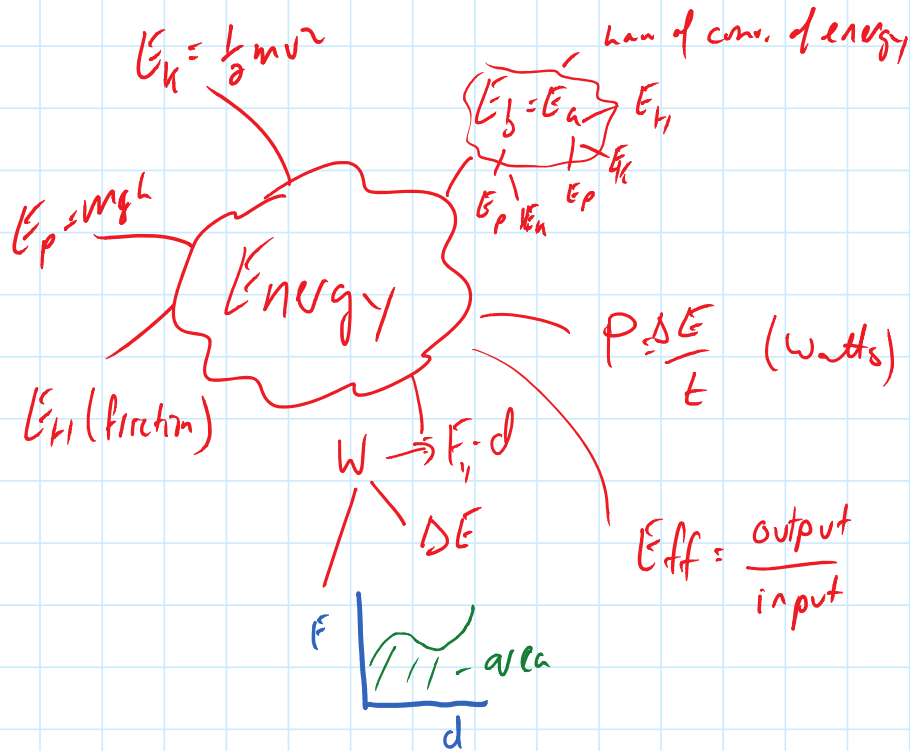


Energy & Momentum Review

Monday, April 14, 2014 1:46 PM



explosion/collision
con. of momentum

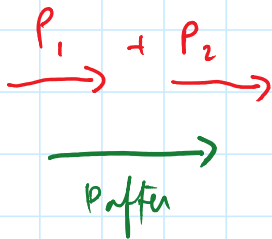
$$P_b = P_c$$

Momentum

$$P = mv$$

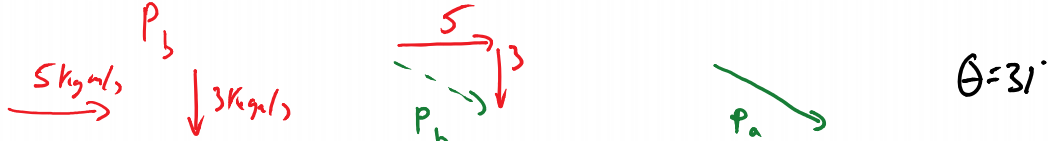
$$\Delta p = m \Delta v = \underline{I} = F \Delta t = \Delta m \cdot v$$

$$F \Delta t = m \Delta v$$

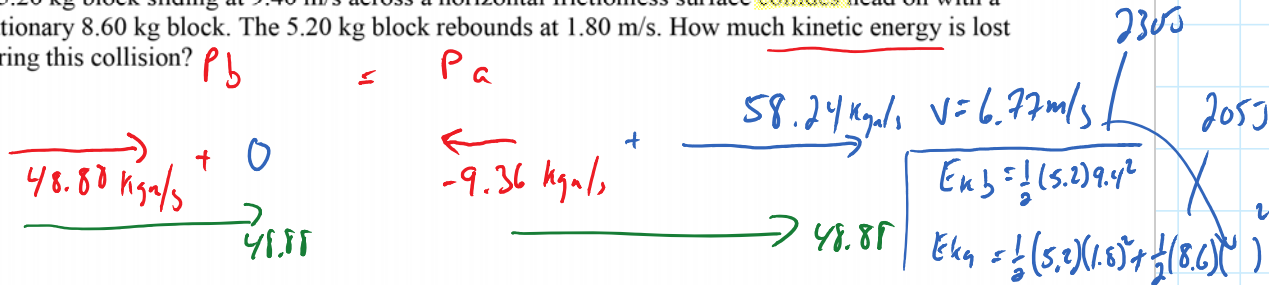


Momentum Questions

1. A 2.0 kg puck travelling due east at 2.5 m/s collides with a 1.0 kg puck travelling due south at 3.0 m/s. They stick together on impact. What is the resultant direction of the combined pucks?



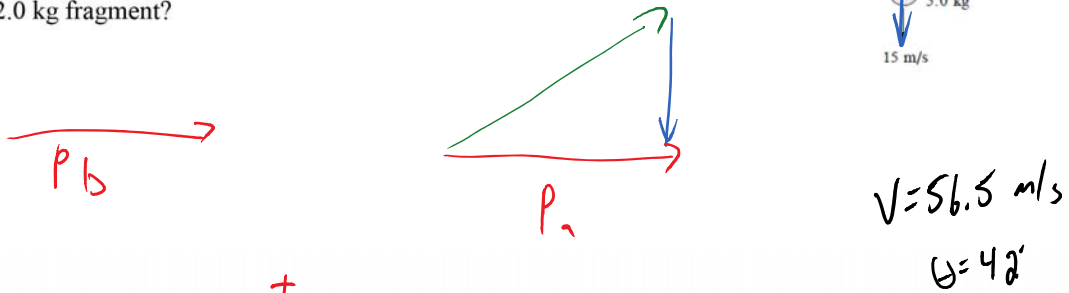
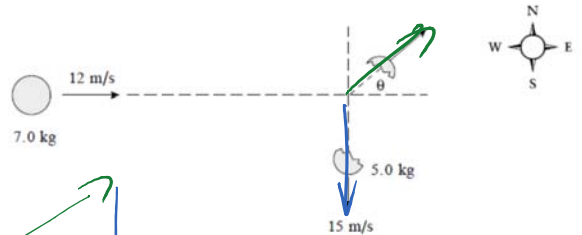
2. A 5.20 kg block sliding at 9.40 m/s across a horizontal frictionless surface collides head on with a stationary 8.60 kg block. The 5.20 kg block rebounds at 1.80 m/s. How much kinetic energy is lost during this collision?



3. Two carts collide while travelling on a smooth surface. It is found that the sum of the kinetic energies of the carts after the collision is the same as before the collision. This collision **must** be

- A. elastic
 B. inelastic.
 C. between carts of identical mass.
 D. between carts that stick together.

4. A 7.0 kg object moving at 12 m/s to the east explodes into two unequal fragments. The larger 5.0 kg fragment moves at 15 m/s south. What is the velocity (speed and direction) of the smaller 2.0 kg fragment?

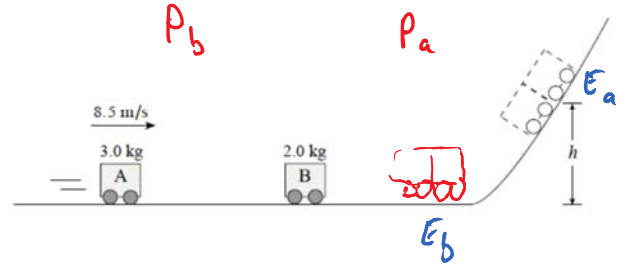


5. A 0.15 kg ball travelling at 25 m/s strikes a wall and bounces back in the opposite direction at 15 m/s. The ball is in contact with the wall for 0.030 seconds. What average force does the wall exert on the ball?

- A. 25 N
 B. 50 N
 C. 1.0×10^2 N
 D. 2.0×10^2 N

$m \Delta v = F \Delta t$
 $(0.15 \text{ kg})(40) = F(0.03)$

6. A 3.0 kg car A travelling 8.5 m/s on a frictionless track collides and sticks on to a stationary 2.0 kg car B. The combined cars will reach what height h ?



$$P_b = P_a$$

$$(3)(8.5) =$$

$$25.5 \text{ kg}\cdot\text{m/s} [R] = (5 \text{ kg})(V_f)$$

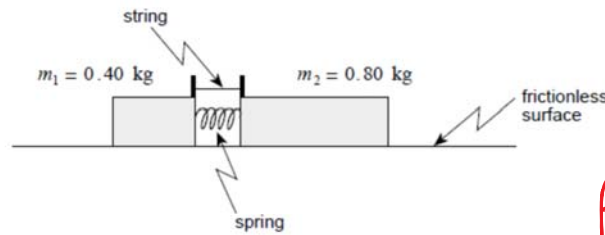
$$V_f = 5.1 \text{ m} [R]$$

$$E_b = E_a$$

$$\cancel{\frac{1}{2}kx^2} = \cancel{\frac{1}{2}kx^2}$$

$$\frac{1}{2}(5)(5.1)^2 = (5)(9.8)h$$

7. Two blocks are initially held together on a frictionless surface as shown in the diagram below. $h = 1.33 \text{ m}$

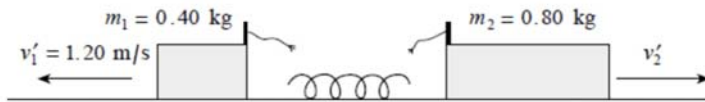


$$P_b = 0 \text{ kg}\cdot\text{m/s}$$

$$P_a = 0 = (.4)(-1.2)$$

$$+ .8(v)$$

When the string is cut, the blocks fly apart as shown.



$$V = .6 \text{ m/s}$$

What work was done on the blocks by the spring?

$$F \times d, \Delta E = \Delta E_k = 0.432 \text{ J}$$