Momentum to energy conservation Solutions

1. (0.0052 kg)(925m/s) + 0 = 2.5052 kg(v) v = 1.92 m/s

Bullet block now projectile off table h = ½ at2 t = 0.55 s

x = vt so 0.55 s (1.92 m/s) = 1.06 m horizontal

1. (0.0052 kg)(925 m/s) + 0 = 1.7552 kg(v) v = 2.74 m/s

Bullet block swing up to store KE as PE

So ½ mv2 = mgh ½ (1.7552 kg)(2.74 m/s)2 = 1.7552(9.8)(h)

h = 0.38 m

1. mgh = ½ mv2 0.05m)(9.8)(1.005 kg) = ½ (1.005)(v)2 v = 0.99 m/s

that 199 m/s is their combined velocity after the collision

(1.005)(199 m/s) = 0 + 0.005(v) v = 199 m/s

1. from the projectile motion find the velocity of the bullet block after the collision

h = ½ at2 t = 0.45 s travels 2.0 m in 0.45 s so v = x/t = 4.43 m/s

That velocity is the velocity of the bullet block after the collision which resulted from the impact of the bullet.

0.258 kg)(4.43m/s) = 0.008(v) v = 142.8 m/s

1. Impulse is change in momentum of the bullet
   1. 0.015 kg(250 m/s – 700 m/s) = – 6.7 N●s
   2. 0.015 kg)(– 700 m/s) = – 10.5 N●s
   3. 0.015 kg (– 250 m/s – 700 m/s) = – 14.25 N●s

The impulse on the bullet is negative so it is positive on the block.

So C > B >A J/m = Δv

Vf a = 6.7/3.5 = 1.93 m/s

Vf b = 10.5/3.5 = 3.0 m/s

Vf c = 14.25/3.5 = 4. 1 m/s