Collision examples

Example 1: inelastic collision

A bullet of mass m = 30 g hits a stationary block of wood of mass 1kg and becomes embedded in it. The coefficient of kinetic friction between the wood and the floor is μ_k = 0.6. As the result of the impact, the block slides a distance d = 1.5 m before stopping. What was the velocity v of the bullet?

Example 2: elastic collision

A tennis ball is placed on top of a basket ball. Both balls are dropped from a height h. Assume that the collision between the ground and the basket ball, and the collision between the basket ball and the tennis ball are perfectly elastic. Assume that both balls can only move vertically. Compute the rebound velocity of the tennis ball. Take $m_{basket\ ball}$ = 0.6 kg, $m_{tennis\ ball}$ = 0.06 kg, g = 9.8 m/s^2, and h = 2 m. The diameter of a tennis ball is 6.5 cm, and the diameter of a basket ball is 24 cm.