Physics 160 Written Homework - Chapter 8.

1 Partial Momentum Conservation

Block A has a mass of $4kg$ and slides to the right at $3m/s$ along a level frictionless surface. At some point, block B (mass of $7kg$) strikes block A from above and the right at an angle of $35°$ with the horizontal with speed $5m/s$. The blocks collide and stick together.

a. Find the direction and magnitude of the velocity of the two blocks after the collision.

b. Reverse the masses and speeds of the two blocks, find the new direction and magnitude of the velocity of the two blocks.

2 Momentum and Energy

Block A, mass $7kg$, hangs from a $1m$ long string that is initially held at a $20°$ angle from the vertical. It is then released, swings down and collides perfectly elastically when the string is vertical with Block B, mass $3kg$, that was initially at rest. Block B then slides along a horizontal surface with $\mu_k = .45$ a total distance of $0.1m$, finally stopping as it compresses a spring with force constant $150N/m$. By how much is the spring compressed?