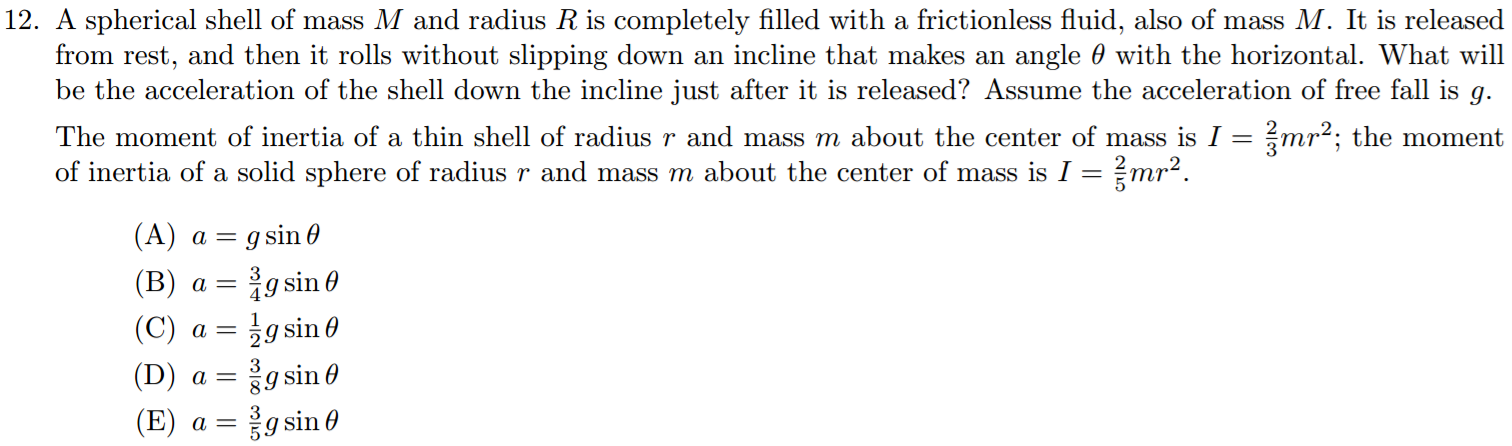
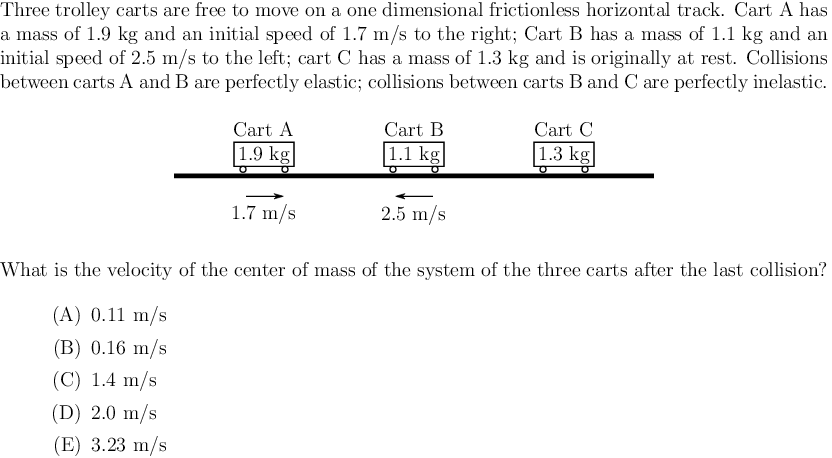
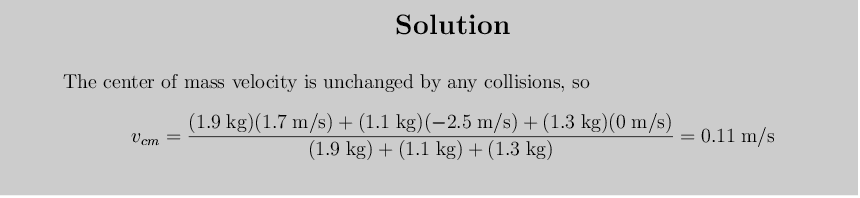


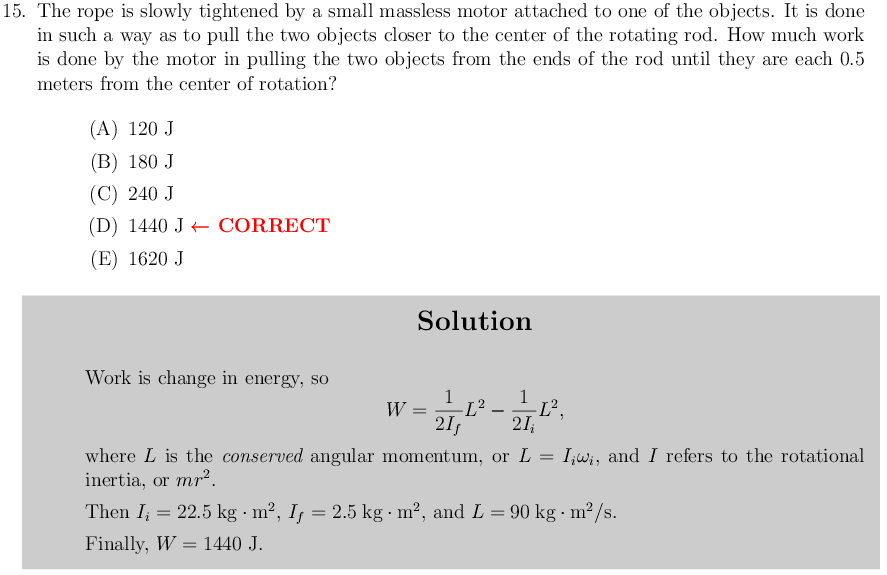
Using conservation of momentum. Since mass cancels, the new velocities are just ratios of the mass to the first velocity. mv0 = (am + bm + cm ….)v1

  
  
Torque acts as a friction here, countering the force of gravity of the sphere rolling down. Note that the water in the sphere does not rotate, so when considering the moment of inertia, we use the inertia of the empty shell. So the force of the sphere rolling down, 2MA is the result of the frictional torque, 2/3 MA subtracted from the force of gravity, 2Mgsin@.





If momentum is conserved, then the velocity of the center of mass never changes. More on this in CCof Physics.



We cannot use ½ Iw^2 here. The conserved angular momentum must be used instead.   
  
   