Name:_____

Solve the following problems in the space provided. Use the back of the page if needed. Each problem is worth 20 points. You <u>must</u> show your work in a logical fashion starting with the correctly applied physical principles. The equations you need are on the equation sheet. Your score will be maximized if your work is easy to follow because partial credit will be awarded.

1. A girl jumps upward from Earth as shown at the right. Consider only the situation while she is at the top of her flight.

(a)State the Law of Conservation of Linear Momentum. It can be in your own words.

(b)Does the girl, alone as a system, obey the Law of Conservation of Linear Momentum? Explain fully.

(c)Does the girl and Earth, together as a system, obey the Law of Conservation of Linear Momentum? Explain.

2. A rude spectator at a hockey game throws an 85.0g coin that skids across the ice. The coin collides head-on at a speed of 3.00m/s with a 350g hockey puck at rest. After the collision, the puck heads off in the same direction that the coin came from at a speed of 1.00m/s. (a)Find the velocity of the coin after the collision and (b)determine if the collision is elastic.

3.   After turning off the DVD player, the disc slows from 27.5rad/s to a stop at a constant rate of 10.0rad/s^2. Find (a)the time needed to bring the disc to rest and (b)the angle through which it rotates.

4.   A light cable is wrapped around a drum several times. The drum is a solid cylinder with a mass of 10.0kg and radius 10.0cm. The other end of the cable is connected to a 1.00kg mass that is at rest a distance 2.00m above the floor when the drum is released and allowed to spin. Find the speed of the mass when it strikes the floor.
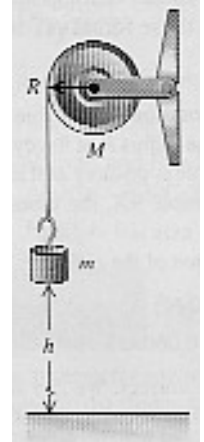
5. A baseball bat leans against a smooth wall making a 60˚ angle with the ground. The center of mass is two-thirds of the way down the bat. Find the minimum coefficient of static friction needed to keep the bat in place.

60˚