Momentum Problem Set

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1 Problems

1. A ball of mass m moving with a velocity v_0 elastically collides with a ball of mass M. What are the final velocities of each ball?

2. A ball of mass m and radius r rests directly on top of a larger ball of mass M and radius R. The center of the larger ball is then dropped from a height h. How far up does the center of the smaller ball go once the large ball hits the ground? Assume elastic collisions between all surfaces and one dimesional motion.

3. A ball of mass m starts at the top of a semi-circular tube of radius R oriented vertically and slides down and sticks to a ball of mass M. The two balls then slide along a frictionless surface and collide with a spring of spring constant k, fully compressing it. This process loses no energy to heat. What is the period of oscillation of the spring system? How far was the spring compressed?