Problem 1

A small ball with mass $M = 0.2$ kg rests on a vertical column with height $h = 5$m. A bullet with mass $m = 0.01$ kg, moving with velocity $v_0 = 500$ m/s, passes horizontally through the center of the ball (Fig. 1). The ball reaches the ground at a distance $s = 20$ m. Where does the bullet reach the ground? What part of the kinetic energy of the bullet was converted into heat when the bullet passed trough the ball? Neglect resistance of the air. Assume that $g = 10$ m/s^2.
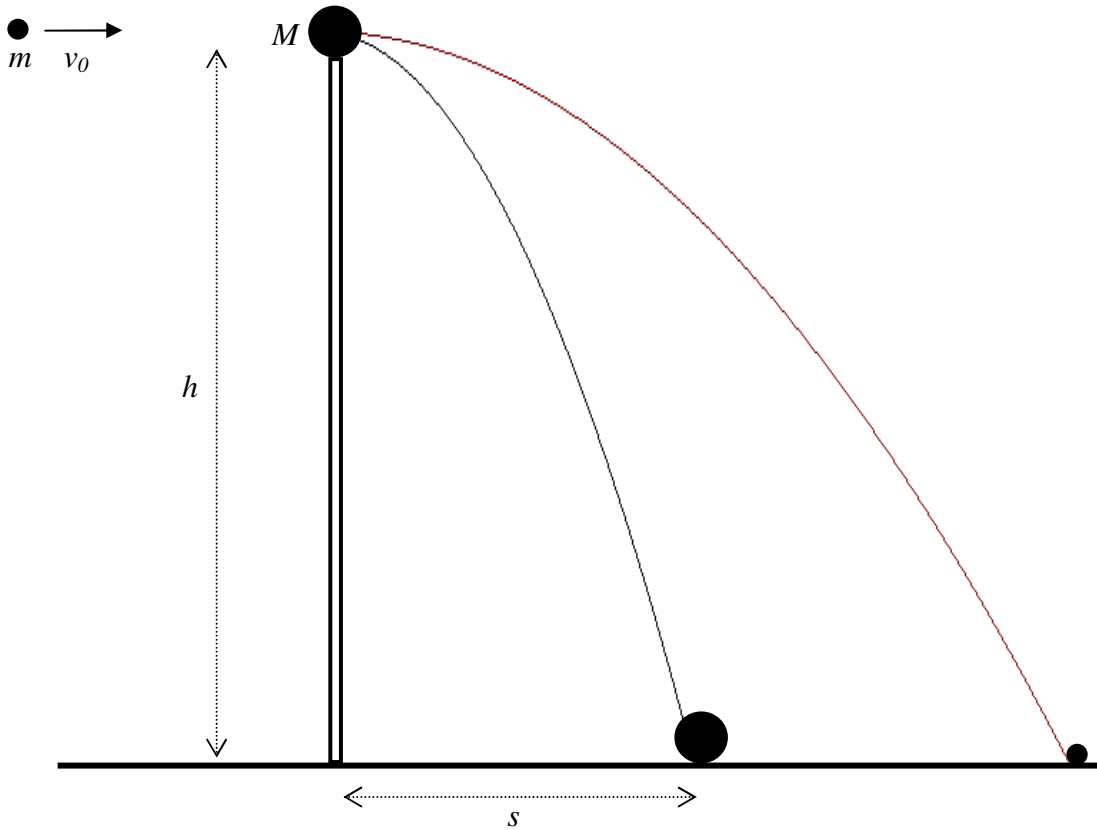

Fig. 1