7. Satellite ***(5 points)***

i) (3 pt) A large ball of mass m_1 is kept at the height h from the floor (so that the center of the ball is at the height $h+d/2$, where d is its diameter). A small ball of mass m_2 is placed upon the large one, and the system is released (so that it starts falling). To which height (from the floor) will the small ball rise, assuming that the collision between the lower ball and ground, and the collision between the balls are absolutely elastic, and $m_1 \gg m_2$?

ii) (2 pt) Consider the following satellite launching project. There are N absolutely elastic balls of masses $m_1 \gg m_2 \gg \cdots \gg m_N$: the first ball (the heaviest) is the lowest; the second ball is placed on top of the first; the third — on top of the second etc. The upmost ball is supposed to become a satellite, i.e. to obtain the velocity $v_N = 7.8\,\mathrm{km/s}$). The lowest ball is at the height $h = 1\,\mathrm{m}$ from the floor, and the system is released. What should be the number of balls N? What should be the mass of the lowest ball, if $m_i/m_{i+1} = 10$, and the mass of the satellite $M_N = 1\,\mathrm{kg}$?