

STEP II, 2001, Q10

- 10 Two particles A and B of masses m and km , respectively, are at rest on a smooth horizontal surface. The direction of the line passing through A and B is perpendicular to a vertical wall which is on the other side of B from A . The particle A is now set in motion towards B with speed u . The coefficient of restitution between A and B is e_1 and between B and the wall is e_2 . Show that there will be a second collision between A and B provided

$$k < \frac{1 + e_2(1 + e_1)}{e_1}.$$

Show that, if $e_1 = \frac{1}{3}$, $e_2 = \frac{1}{2}$ and $k < 5$, then the kinetic energy of A and B immediately after B rebounds from the wall is greater than $mu^2/27$.



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