

STEP II, 2018, Q9

- 9 Two small beads, A and B , of the same mass, are threaded onto a vertical wire on which they slide without friction, and which is fixed to the ground at P . They are released simultaneously from rest, A from a height of $8h$ above P and B from a height of $17h$ above P .

When A reaches the ground for the first time, it is moving with speed V . It then rebounds with coefficient of restitution $\frac{1}{2}$ and subsequently collides with B at height H above P .

Show that $H = \frac{15}{8}h$ and find, in terms of g and h , the speeds u_A and u_B of the two beads just before the collision.

When A reaches the ground for the second time, it is again moving with speed V . Determine the coefficient of restitution between the two beads.



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