

STEP III, 2011 Q10

- 10 Particles P and Q , each of mass m , lie initially at rest a distance a apart on a smooth horizontal plane. They are connected by a light elastic string of natural length a and modulus of elasticity $\frac{1}{2}m\omega^2$, where ω is a constant.

Then P receives an impulse which gives it a velocity u directly away from Q . Show that when the string next returns to length a , the particles have travelled a distance $\frac{1}{2}\pi u/\omega$, and find the speed of each particle.

Find also the total time between the impulse and the subsequent collision of the particles.



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