

STEP III, 2004, Q10

- 10 A particle P of mass m is attached to points A and B , where A is a distance $9a$ vertically above B , by elastic strings, each of which has modulus of elasticity $6mg$. The string AP has natural length $6a$ and the string BP has natural length $2a$. Let x be the distance AP .

The system is released from rest with P on the vertical line AB and $x = 6a$. Show that the acceleration \ddot{x} of P is $\frac{4g}{a}(7a - x)$ for $6a < x < 7a$ and $\frac{g}{a}(7a - x)$ for $7a < x < 9a$.

Find the time taken for the particle to reach B .



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