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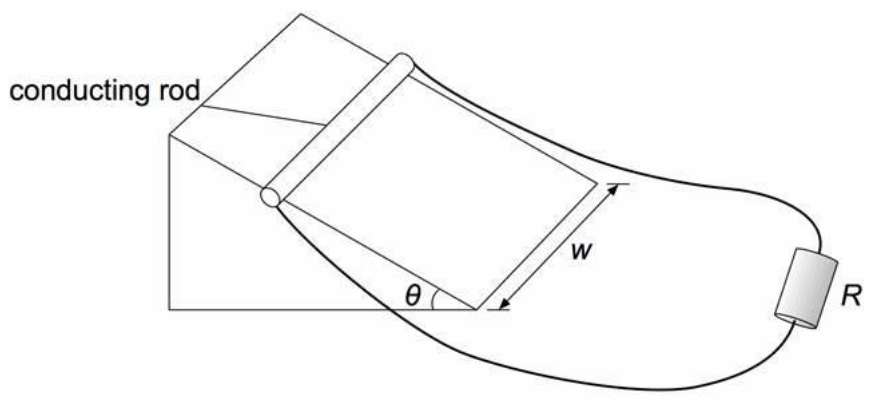
The figure below shows a conducting rod of length L and mass m placed on a very long and smooth plane of width w which makes an angle of θ to the horizontal. The rod is connected to a resistor of resistance R through light and flexible wires. The rod is then released from rest at the top of the plane and moves in a uniform magnetic flux density B that is vertically downwards everywhere. The rod attains terminal velocity after some time.



What is the magnitude of the rod's terminal velocity?

A

$\frac{mgR\tan\theta}{B^2w^2}$

B

$\frac{mgR\tan\theta}{B^2L^2}$

C

$\frac{mgR\tan\theta}{B^2w^2\cos\theta}$

D

$\frac{mgR\tan\theta}{B^2L^2\cos\theta}$