

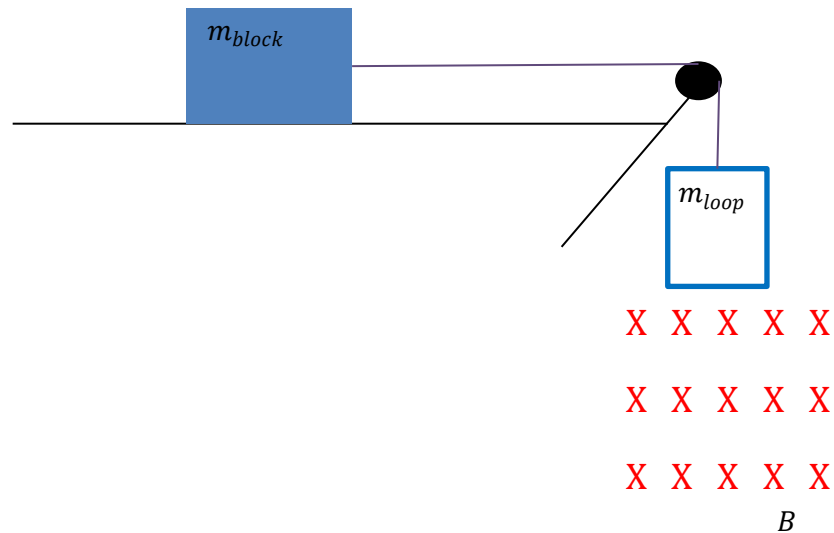
Name _____

Physics 111 Quiz #4, February 11, 2022

Please show all work, thoughts and/or reasoning in order to receive partial credit. The quiz is worth 10 points total.

I affirm that I have carried out my academic endeavors with full academic honesty.

A square metal loop of mass $m_{loop} = 25mg$, resistance $R = 0.1\Omega$, and sides of length $L = 10cm$ is connected by a massless rope around a massless pulley to a block of mass $m_{block} = 20mg$. The square metal loop is released from rest and falls through a magnetic field of magnitude $B = 50mT$ pointing into the page. Friction exists between the block and the horizontal surface it is on with coefficient of friction $\mu = 0.87$. Assume that the square loop reaches terminal speed as soon as it enters the magnetic field.



1. What is the magnitude of the tension force in the rope?

2. What is the magnitude and direction of the current induced in the wire loop as it falls?

3. What is the magnitude of the potential difference induced across the wire loop?

4. What is the terminal speed of the wire loop?

5. What is the power dissipated as heat across the wire loop?