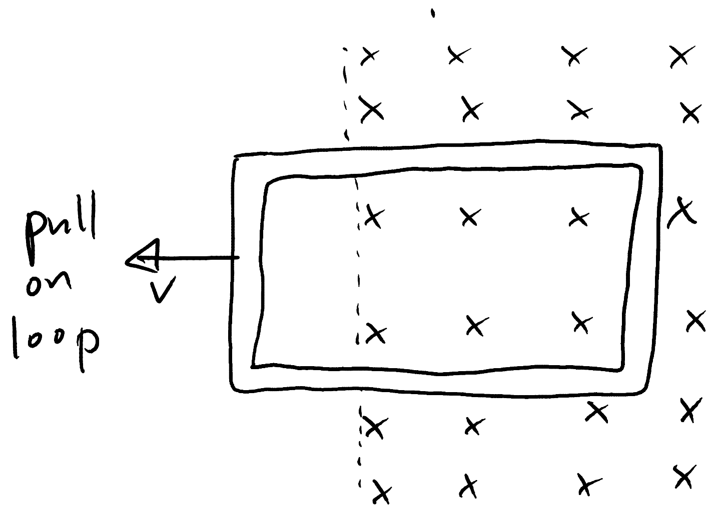
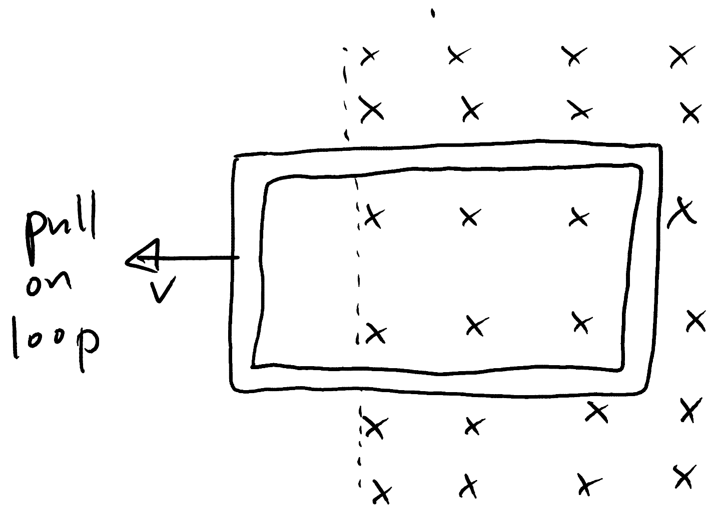


A loop of wire is pulled out of a magnetic field. The magnetic force on this wire is

A) Zero
B) Upwards
C) Downwards
D) To the left
E) To the right

EXTRA: Imagine you are in the frame of reference of the wire. Is there any force on the wire? If so, why?



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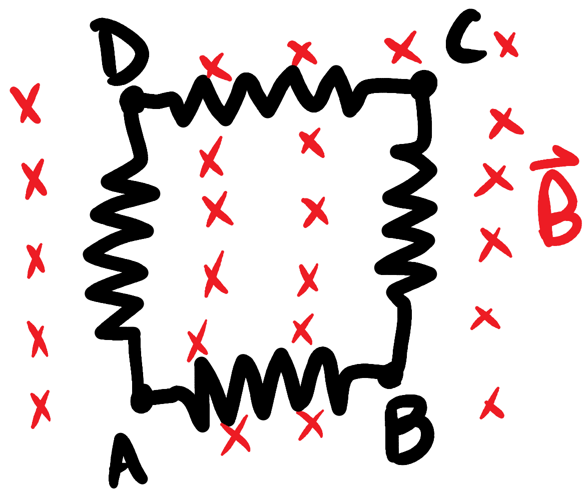
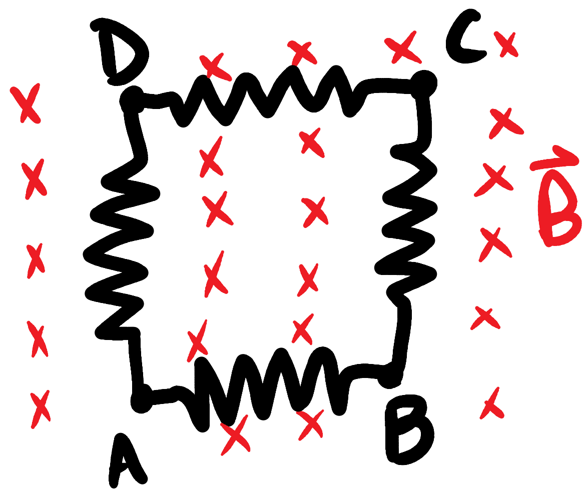


The magnetic field is increasing in magnitude inducing a current of magnitude I. We can say that the net voltage drop

$$\Delta V_{A\to B} + \Delta V_{B\to C} + \Delta V_{C\to D} + \Delta V_{D\to A}$$

is equal to:

A) 4 I R
B) -4 I R
C) 0 (because of Kirchoff's Loop Law)
D) None of the above



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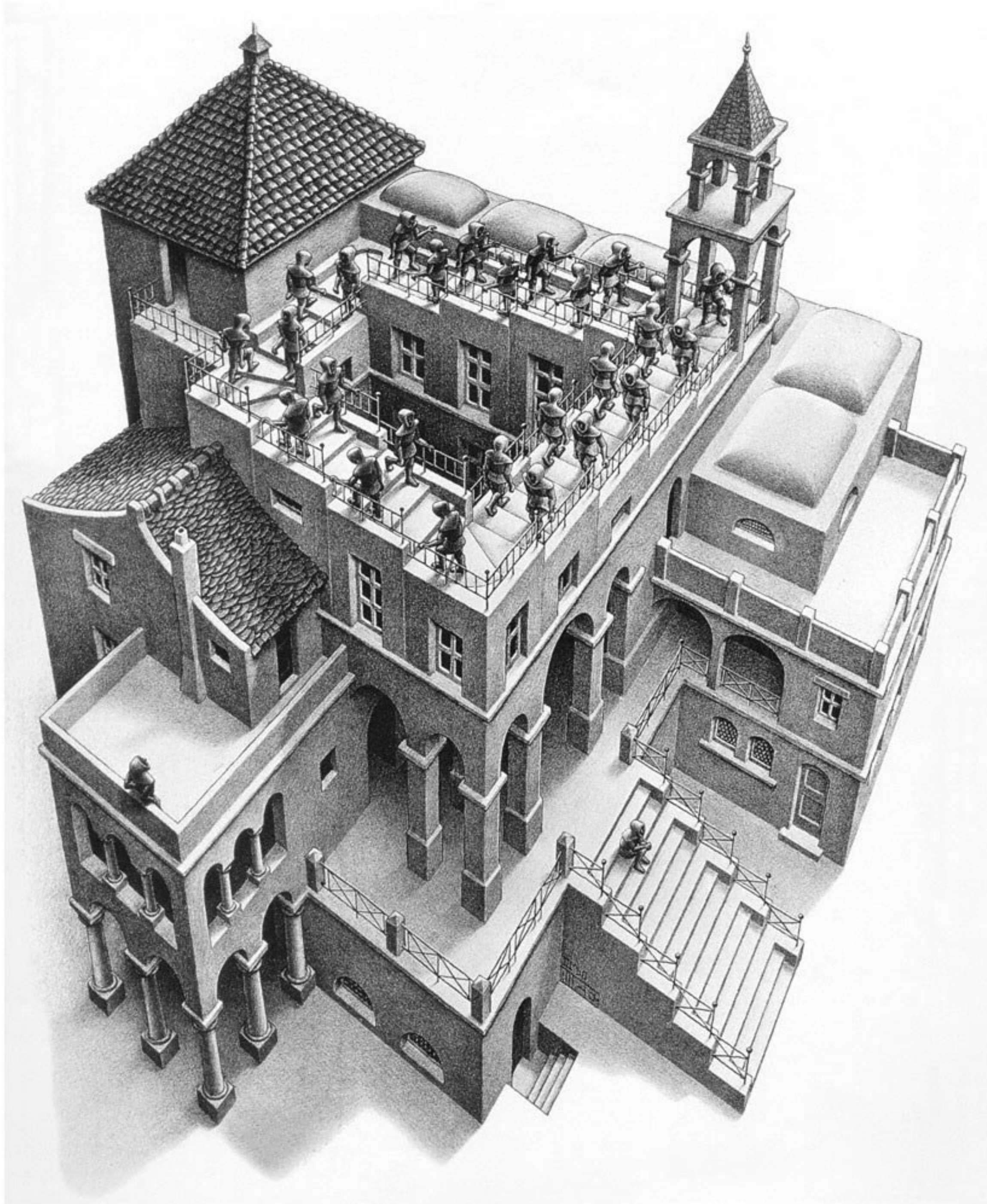
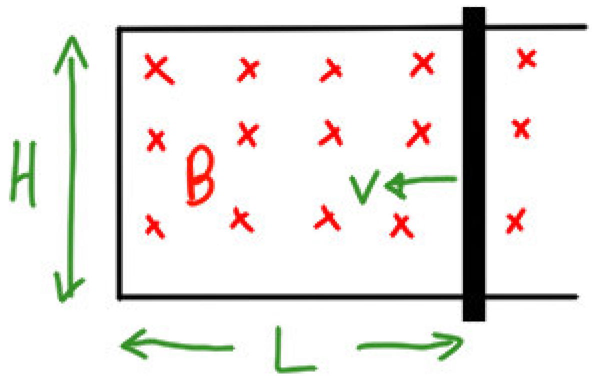
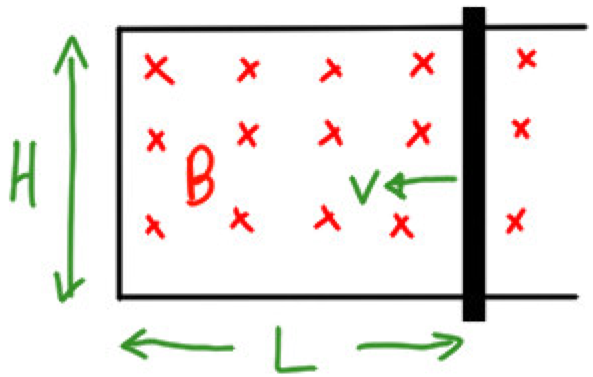




A conducting rod moves with speed v along a wire as shown. The EMF in the conducting loop is equal to:

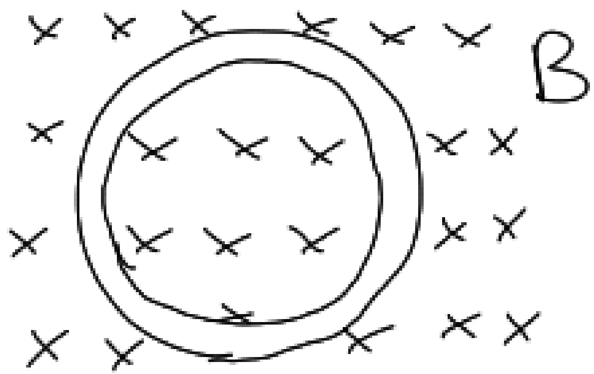
A) 0
B) H L B v
C) H L B
D) H B v
E) L B v

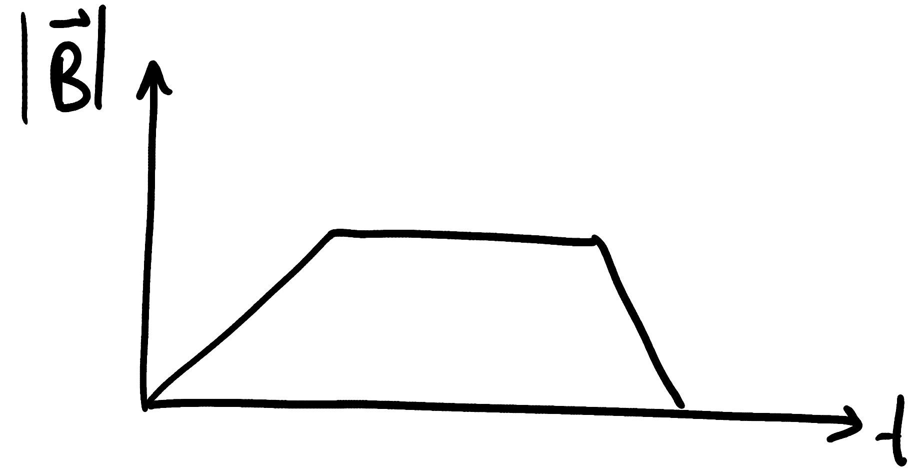


A conducting rod moves with speed v along a wire as shown. The magnitude of the EMF in the conducting loop is equal to:

A) 0
B) H L B v
C) H L B
D) H B v
E) L B v

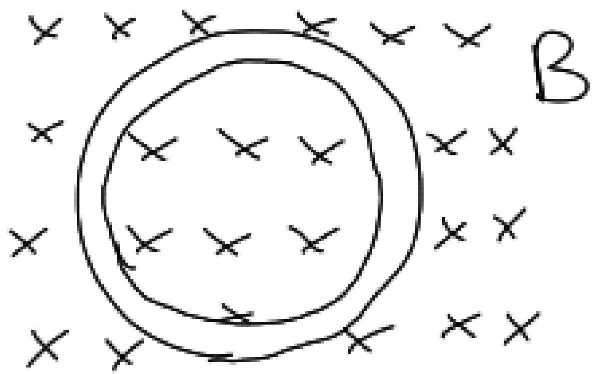
EXTRA: What would the current look like as a function of time if these are real wires with resistance?

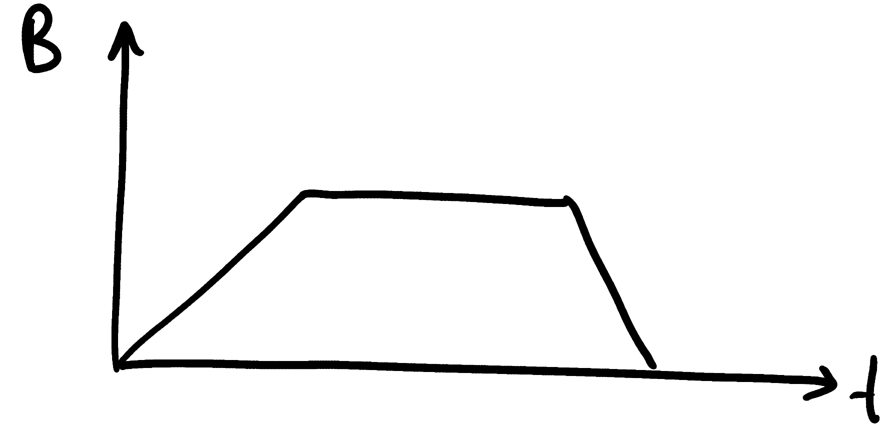




The magnetic field through a loop changes with time, as shown in the graph. Sketch a graph of the current in the loop as a function of time.

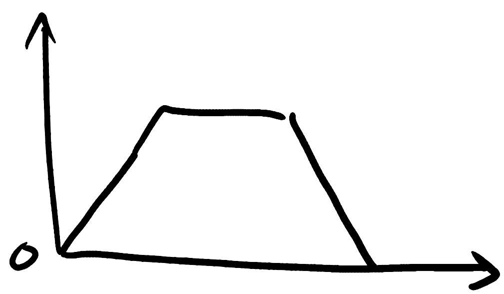
(choices on next page)



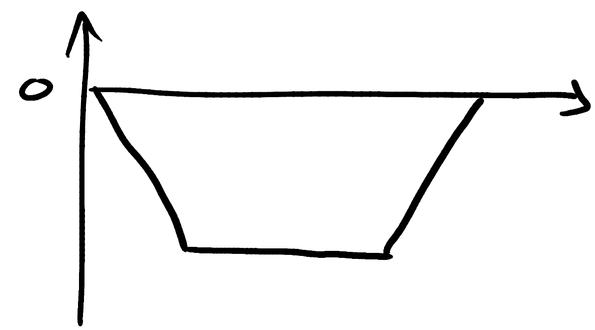


Which represents I(t) in the loop?

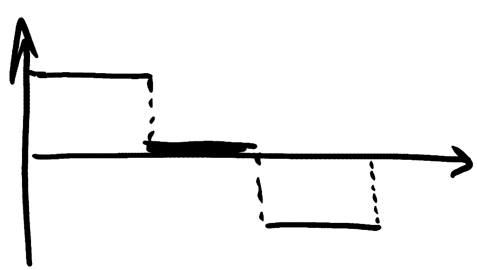
A)



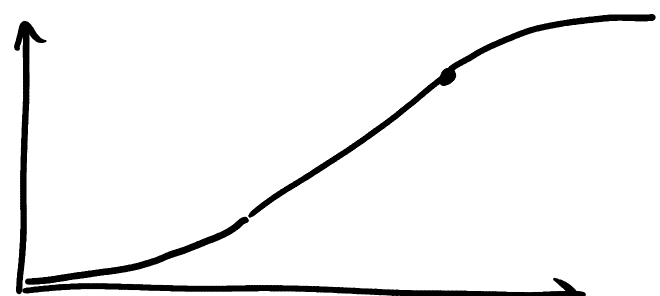
B)



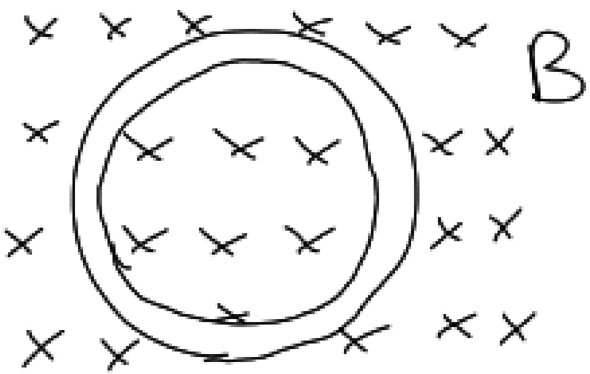
C)

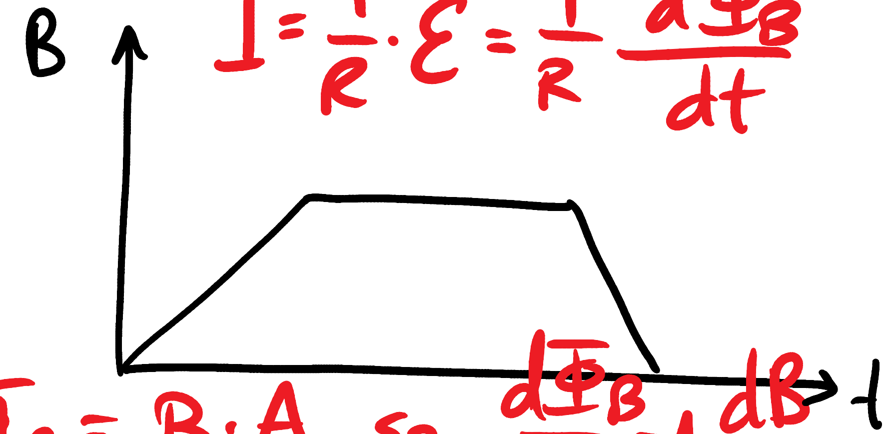


D)



E) None of the above

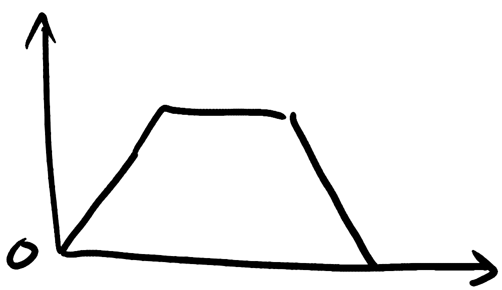


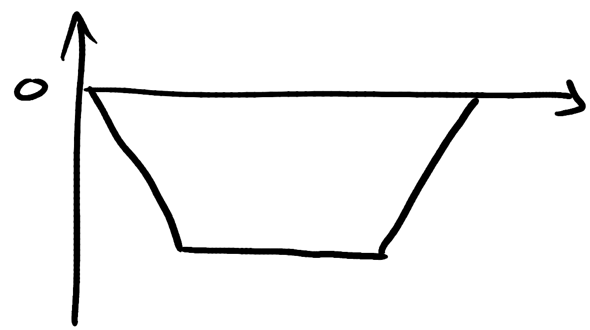


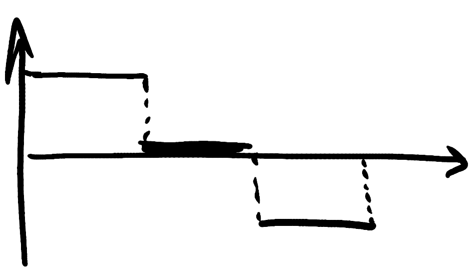
$$I = \frac{1}{R} \cdot \mathcal{E} = \frac{1}{R} \frac{d\Phi_B}{dt}$$

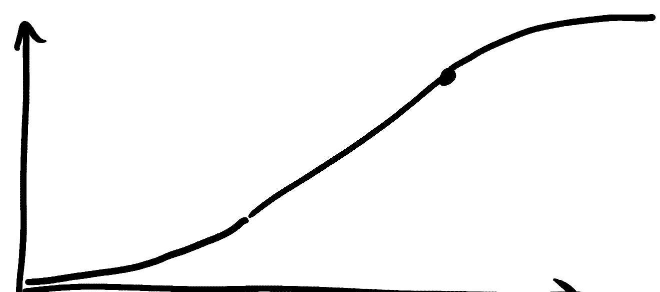
$$\Phi_B = B \cdot A \quad \text{so} \quad \frac{d\Phi_B}{dt} = A \frac{dB}{dt}$$

Which represents $I(t)$ in the loop?

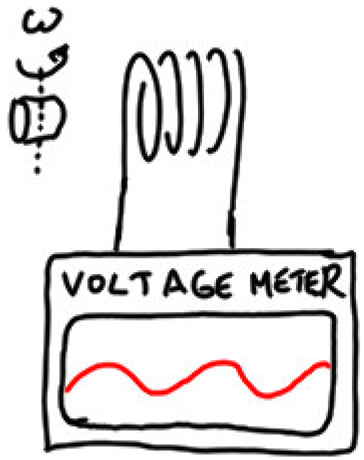
A) 

B) 

C) 

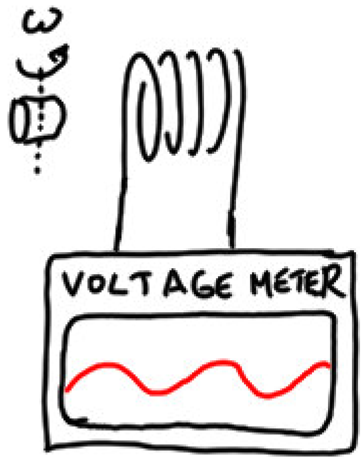
D) 

E) None of the above



A magnet is rotated a frequency ω near a coil, and the voltage across the coil is graphed as a function of time. How will the graph change if the frequency is increased?

(Choices will be given later)



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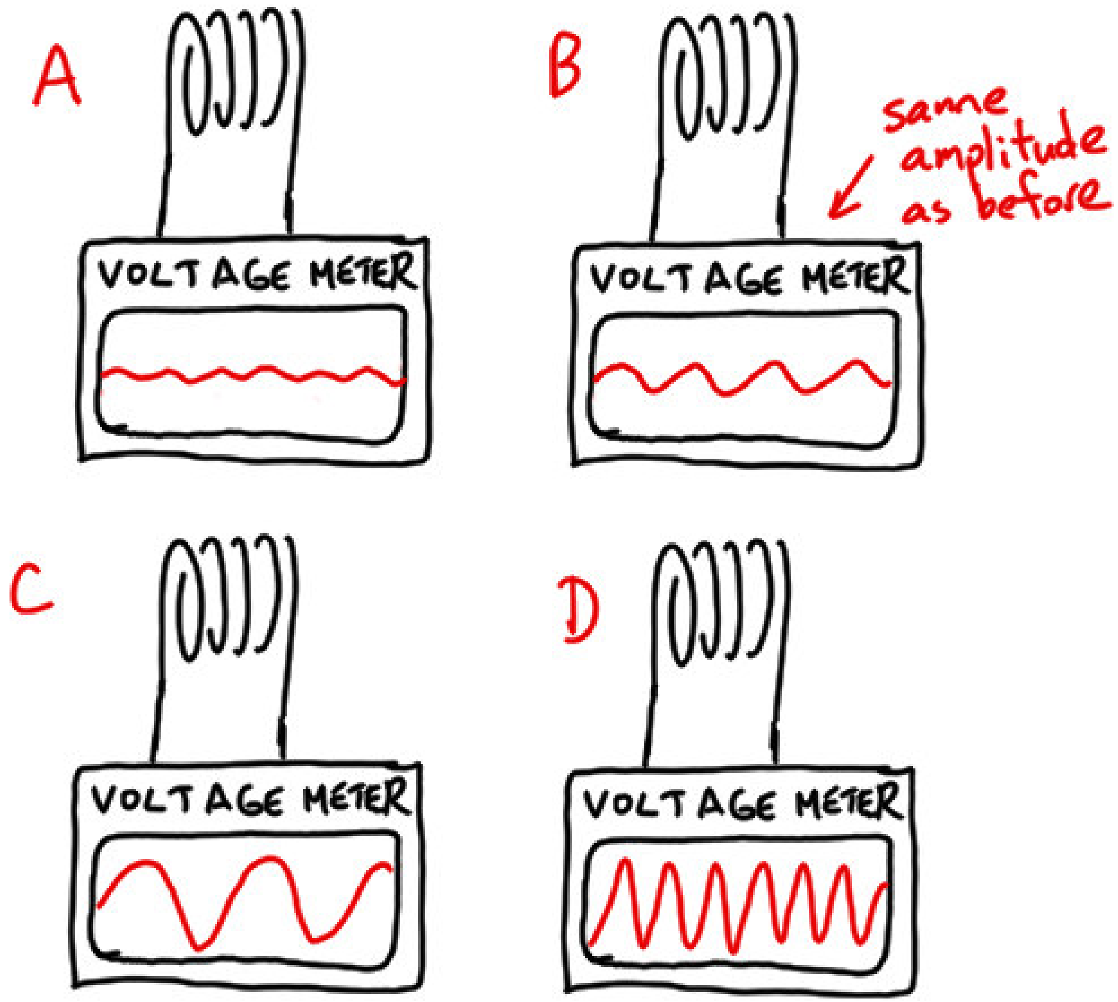

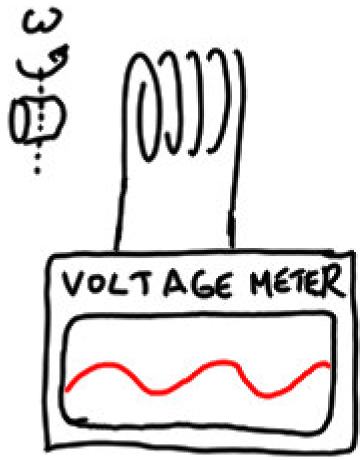

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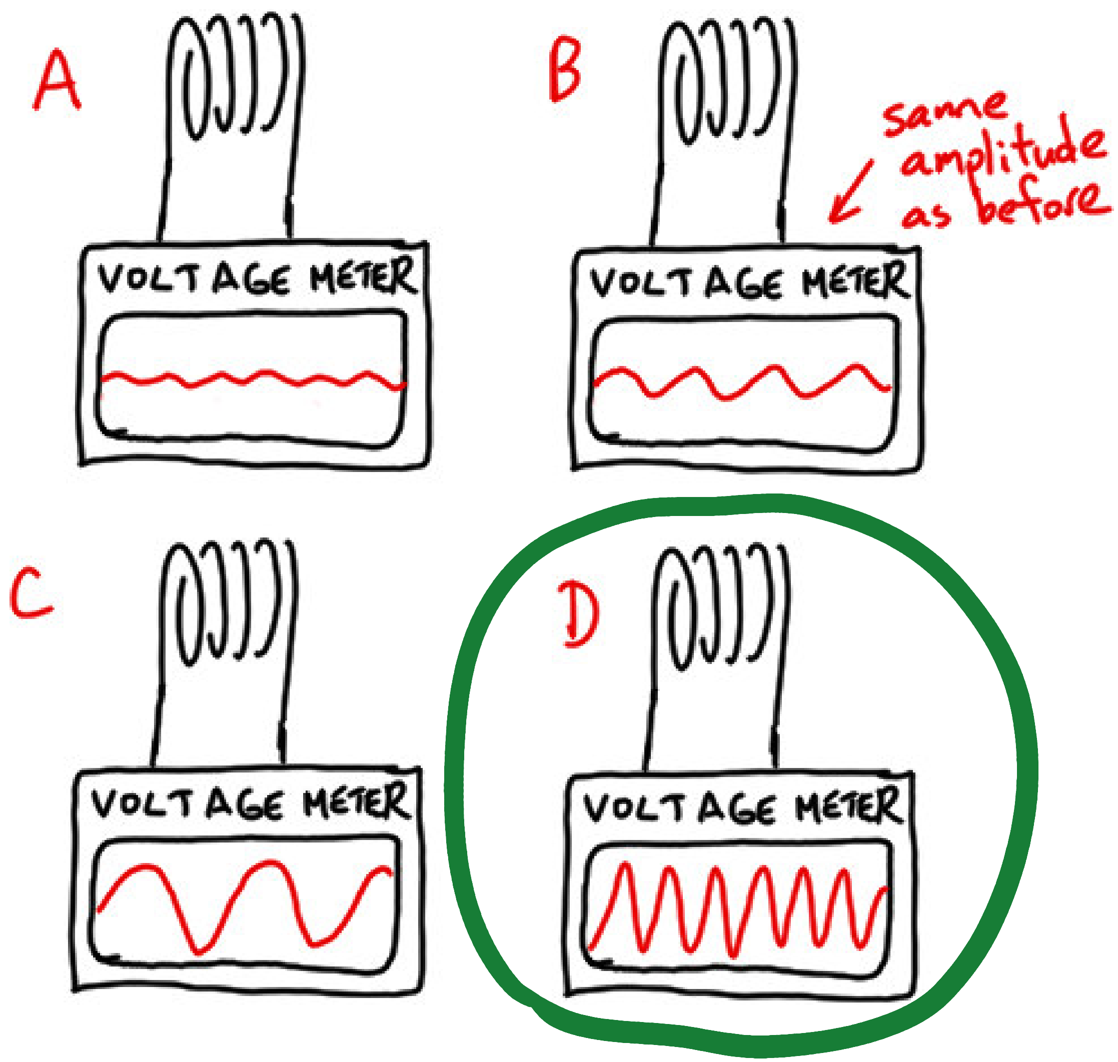
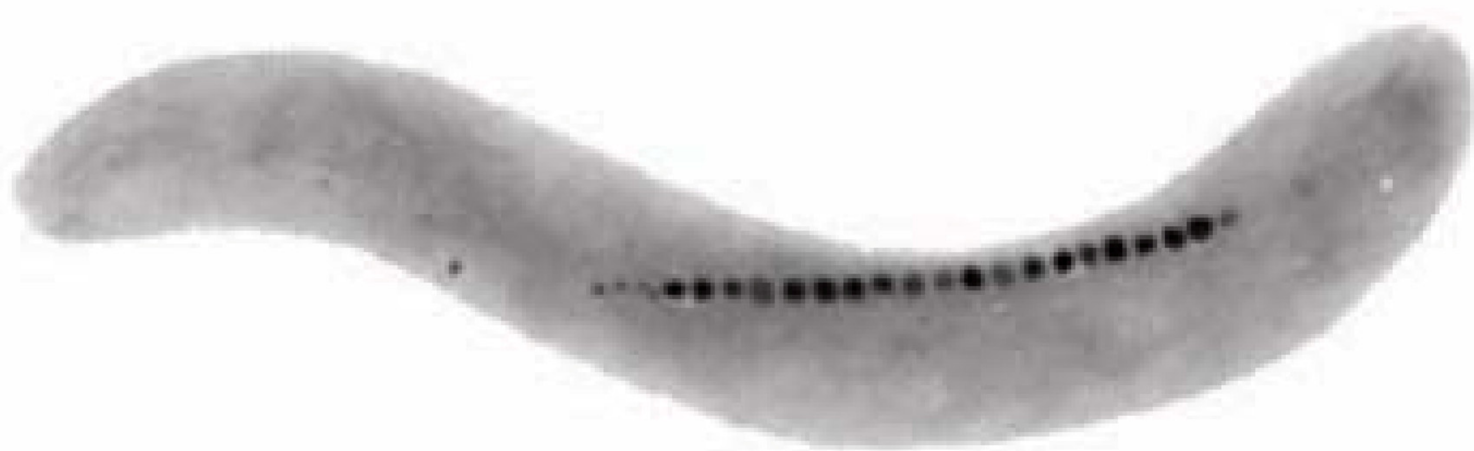
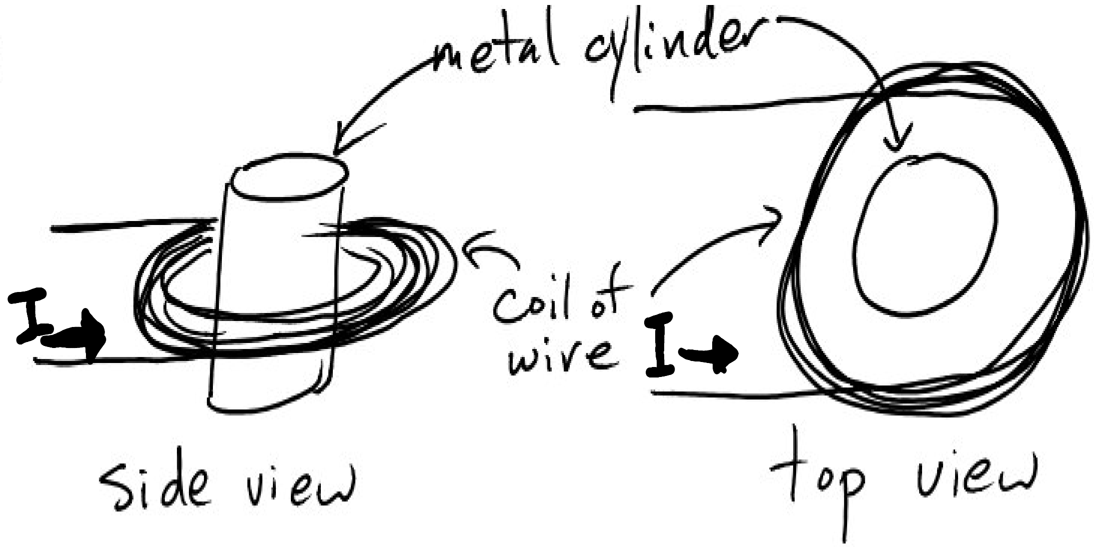




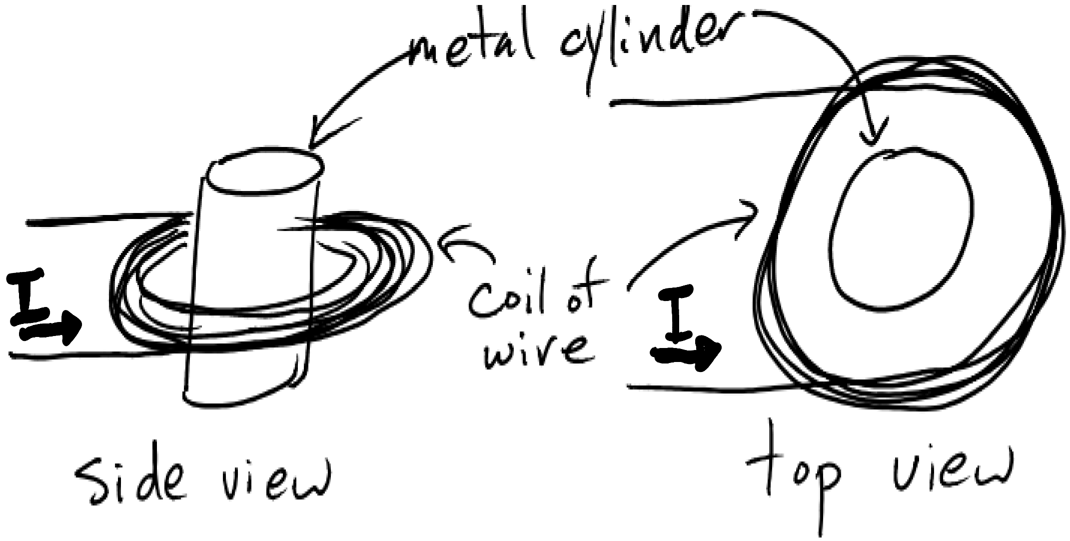
②



= pop can

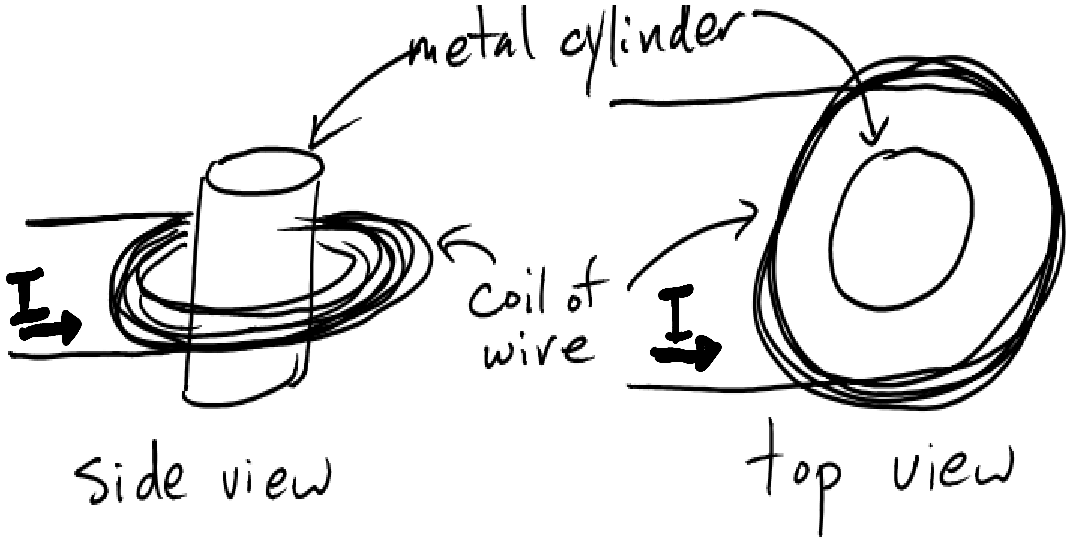
A flexible metal cylinder is surrounded by a coil of wire as shown. If the current through the coil is rapidly increased (by connecting it to a big charged capacitor), what will happen to the cylinder?

Hint: will there be any forces on the cylinder??



When the current is rapidly increased, the pop can will:

A) Shoot upwards
B) Shoot downwards
C) Bulge outward
D) Bulge inward
E) Heat up but hold its position and shape



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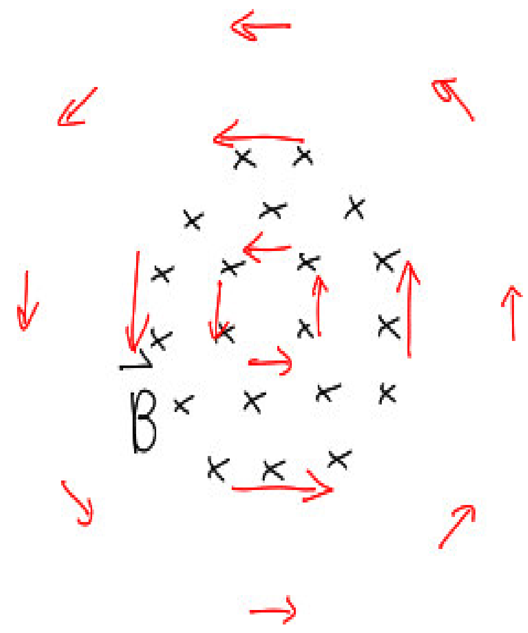
In the picture to the right, the magnetic field in the central region is produced by a solenoid. If the red arrows show an electric field that is being induced by changes in this magnetic field, we can say



A) the current in the solenoid is increasing.
B) the current in the solenoid is decreasing.
C) Either A or B are possible
D) This scenario is impossible: the electric field induced by the magnetic field should be pointing clockwise.

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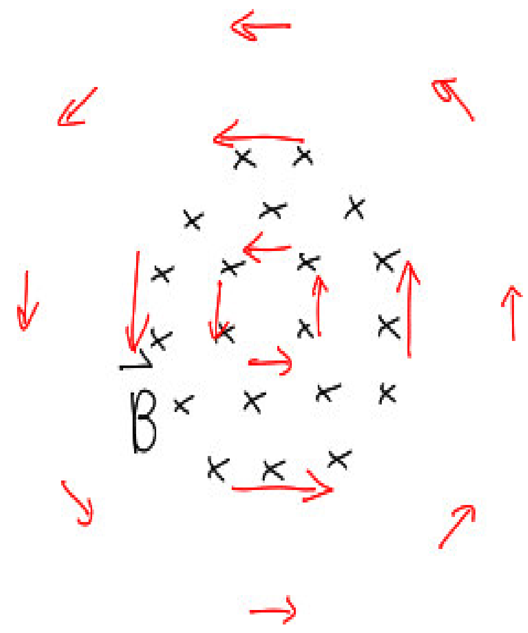

A) **the current in the solenoid is increasing.**
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