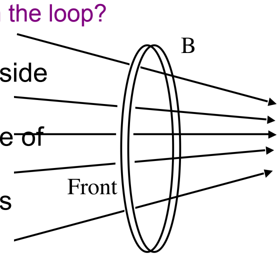
A metal soda can has a wire loop around it. Suddenly a large increasing I runs in the wire loop. What happens?

A conducting loop sits in a B field.

The coil sits still, and the field *decreases* in intensity with time. Which direction does current flow through the loop?



A: Down the front side of the loop
B: Up the front side of the loop
C: No current flows
D: ??

A conducting loop sits in a B field.

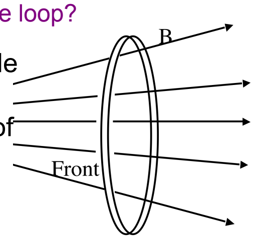
The coil sits still, and the field *increases* in intensity with time. Which direction does current flow through the loop?

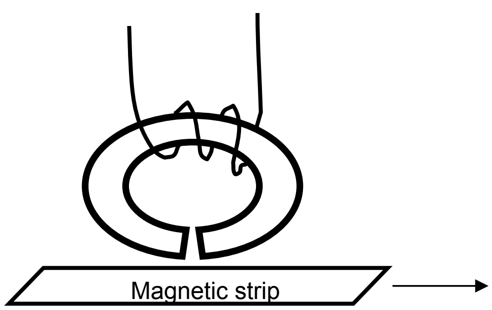
A: Down the front side of the loop

B: Up the front side of the loop

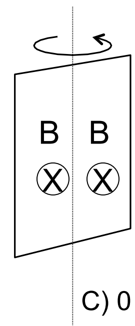
C: No current flows

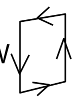
D: ??



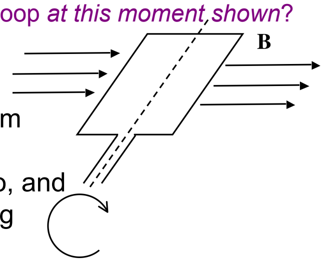


A rectangular wire loop rotates in a fixed external B field. At the instant shown, the loop is out of the plane of the page with the left side of the loop above the page and coming out of the page, the right side in going in. The induced current is ...



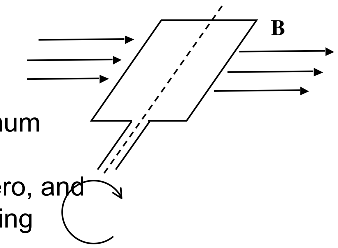
A) CCW    B) CW   C) 0

A hand-cranked electric generator is rotating CCW in a constant uniform B-field which points right. What can you say about the magnetic flux through the loop *at this moment,shown*?



A) Maximum
B) Zero
C) Nonzero, and changing

What can you say about the current generated by the loop at this moment shown?



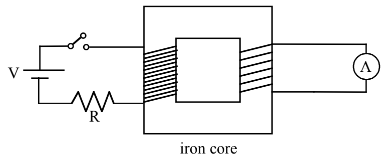
A) Maximum
B) Zero
C) Nonzero, and changing

Suppose some high voltage AC power lines run along the edge of your property. Could you steal electricity from them (without running any cables to the power lines)?

A) Yes (Coulomb's law!)
B) Yes (Faraday's law!)
C) No - this violates conservation of energy
D) ?? I can't think of any way to do this.

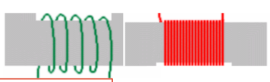
Yes it works.
Yes it has been done.
Yes, it is illegal.
Yes, you will get caught by the power company

The primary coil of a transformer is connected to a battery, a resistor, and a switch. The secondary coil is connected to an ammeter. When the switch is closed, the ammeter shows…



A: I=0 B: I ≠0, for a brief instant
C: steady I ≠0 after switch closed

From Mazur "Peer Instruction"



Transformer

$$|V_p| = N_p \frac{\Delta\Phi_B}{\Delta t}$$

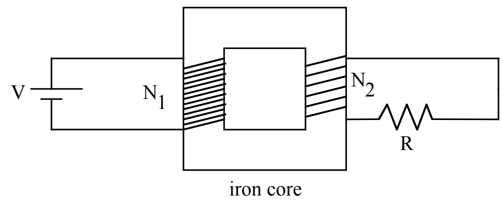
$$|V_s| = N_s \frac{\Delta\Phi_B}{\Delta t}$$

$$\frac{V_s}{V_p} = \frac{N_s}{N_p}$$

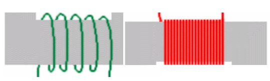
If there are 40 primary coils and you want to reduce the Voltage from 120 V to 6 V, how many secondary coils do you want?

A) 2 coils B) 40 coils C) 800 coils
D) Other/This doesn't seem possible

A transformer is attached to a battery and a resistor as shown. In "steady state", the voltage difference across the resistor R is ...



A: V B: V N1/N2 C: V N2/N1
D: 0 E: Other

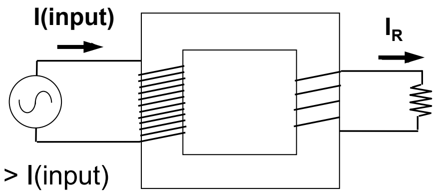


Transformer

If there are 4 primary coils and 40 secondary coils, what can you say about "power out" (V_{out}*I_{out}) compared to "power in" (V_{in}*I_{in}) (for AC input)

A) About the same
B) Power out will be 10x greater
C) Power out will be 10x smaller
D) Something else!

A step-down transformer is attached to an AC voltage source and a resistor. How does I_R compare to the current that is drawn from the AC source I(in)



A) I_R > I(input)
B) I_R < I(input)
C) I_R = I(input)