Physics 1161: Lecture 14

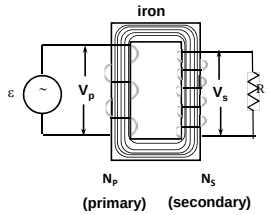
Transformers

- **Textbook Sections 23-7 – 23-8**

Transformers

Key to efficient power distribution

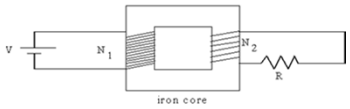
Increasing current in primary creates an increase in flux through primary and secondary.



Transformers

- Key to Modern electrical system
- Starting with 120 volts AC
  - Produce arbitrarily small voltages.
  - Produce arbitrarily large voltages.
- Nearly 100% efficient

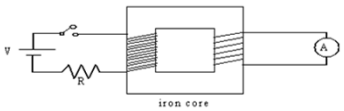
Checkpoint
Transformer 1



The voltage difference across the resistor R is

1. V
2. V N_1/N_2
3. V N_2/N_1
4. 0

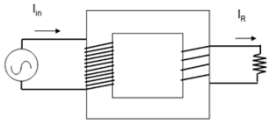
Checkpoint
Transformer 2



When the switch is closed, the ammeter shows

1. I=0
2. I quickly jumps to a non-zero value and then quickly returns to zero.
3. I is a steady non-zero value.

Checkpoint
Transformer 3



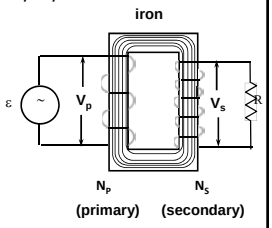
How does I_R compare to the current that is drawn from the AC source I_{in}?

$I_R < I_{in}$
$I_R = I_{in}$
$I_R < I_{in}$

Checkpoint
Transformer

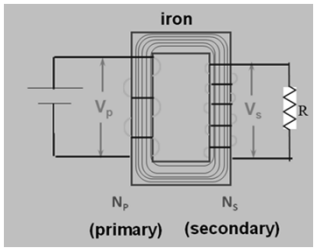
The good news is you are going on a trip to France. The bad news is that in France the outlets have 240 volts. You remember from Phy1152 that you need a transformer, so you wrap 100 turns around the primary. How many turns should you wrap around the secondary if you need 120 volts out to run your hair dryer?

1) 50 2) 100 3) 200



A 12 Volt battery is connected to a transformer that has a 100 turn primary coil, and 200 turn secondary coil. What is the voltage across the secondary after the battery has been connected for a long time?

1. $V_s = 0$
2. $V_s = 6$ V
3. $V_s = 12$ V
4. $V_s = 24$ V



In a transformer the side with the most turns always has the larger peak voltage. (T/F)

1. True
2. False

In a transformer the side with the most turns always has the larger peak current. (T/F)

1. True
2. False

In a transformer the side with the most turns always dissipates the most power. (T/F)

1. True
2. False