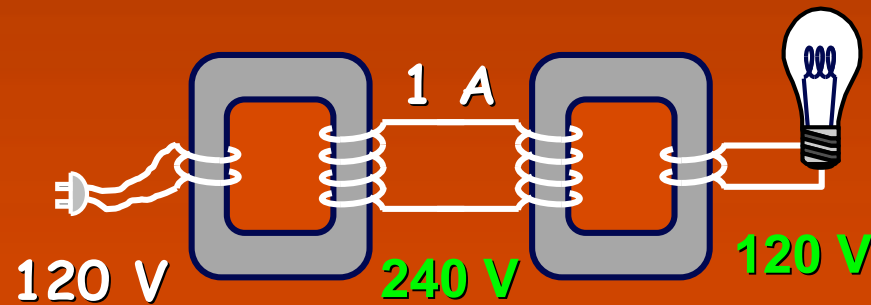


## ConceptTest 33.1b Transformers II

Given that the intermediate current is 1 A, what is the current through the lightbulb?

- 1)  $1/4$  A
- 2)  $1/2$  A
- 3) 1 A
- 4) 2 A
- 5) 5 A



## ConceptTest 33.1b Transformers II

Given that the intermediate current is 1 A, what is the current through the lightbulb?

1) 1/4 A

2) 1/2 A

3) 1 A

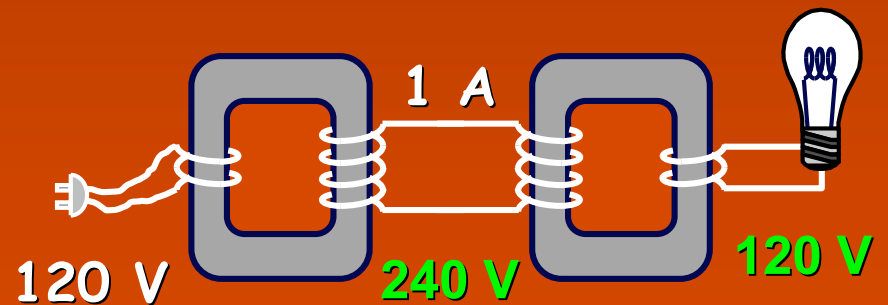
4) 2 A

5) 5 A

Power in = Power out

$$240 \text{ V} \times 1 \text{ A} = 120 \text{ V} \times ???$$

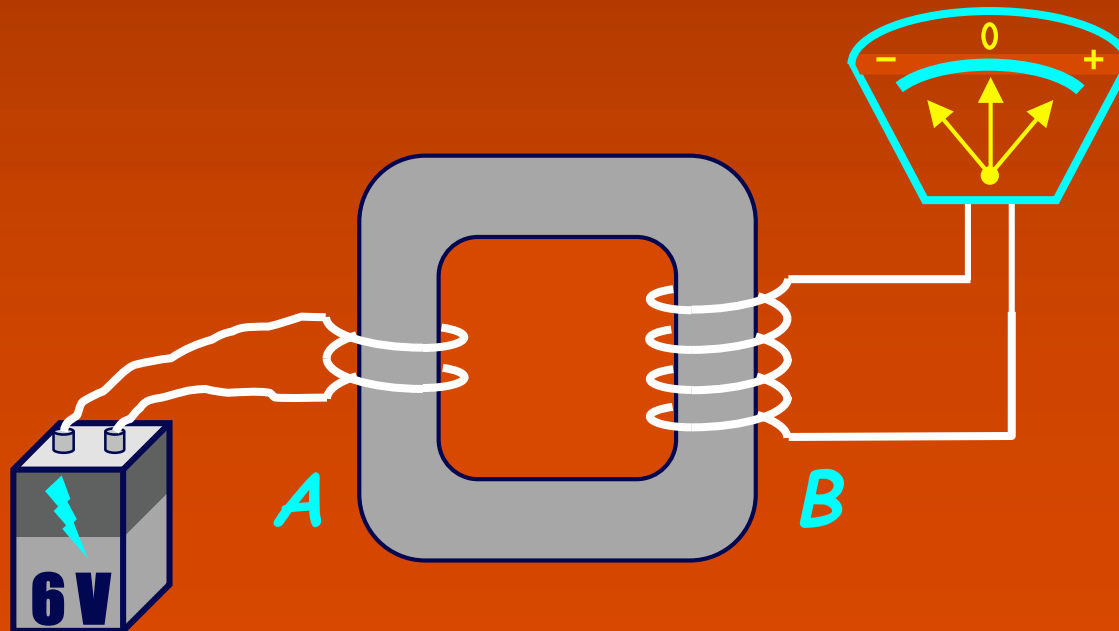
The unknown current is 2 A.



## ConceptTest 33.1c Transformers III

A 6 V battery is connected to one side of a transformer. Compared to the voltage drop across coil A, the voltage across coil B is:

- 1) greater than 6 V
- 2) 6 V
- 3) less than 6 V
- 4) zero

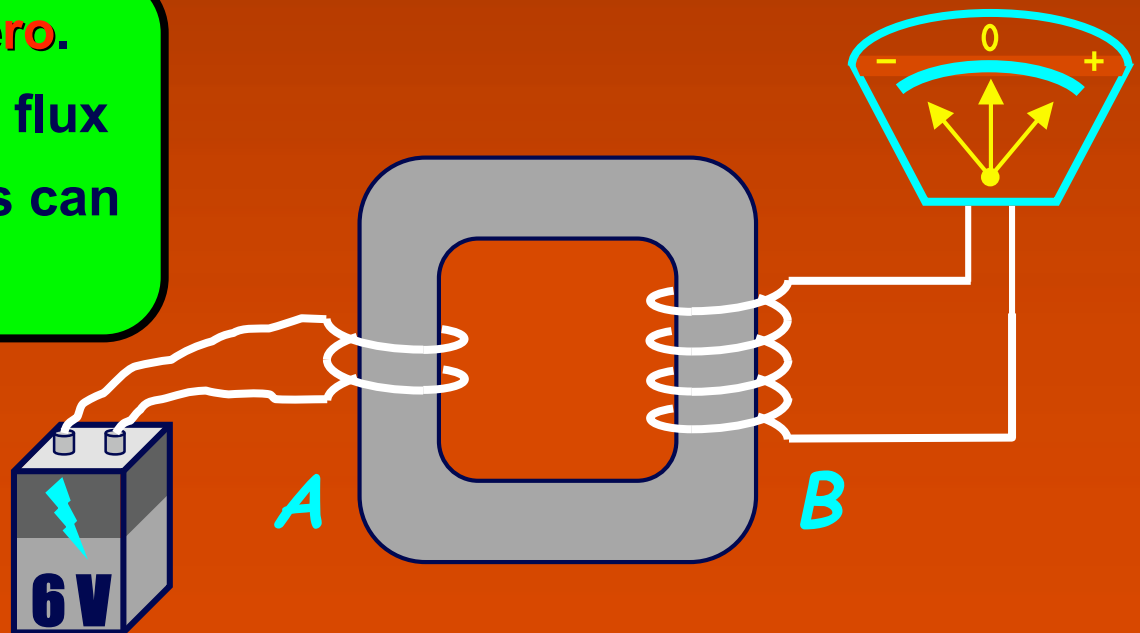


## ConceptTest 33.1c Transformers III

A 6 V battery is connected to one side of a transformer. Compared to the voltage drop across coil A, the voltage across coil B is:

- 1) greater than 6 V
- 2) 6 V
- 3) less than 6 V
- 4) zero

The voltage across B is zero. Only a changing magnetic flux induces an EMF. Batteries can only provide DC current.

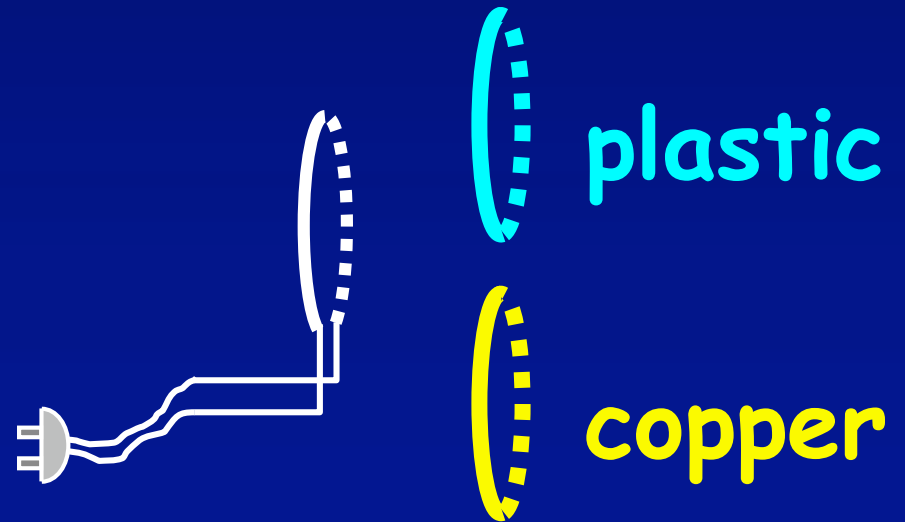


## ConceptTest 34.1a

## EM Waves I

A loop with an **AC current** produces a changing magnetic field. Two loops have the same area, but one is made of **plastic** and the other **copper**. In which of the loops is the induced **voltage** greater?

- 1) the **plastic** loop
- 2) the **copper** loop
- 3) **voltage** is **same** in both



## ConceptTest 34.1a

## EM Waves I

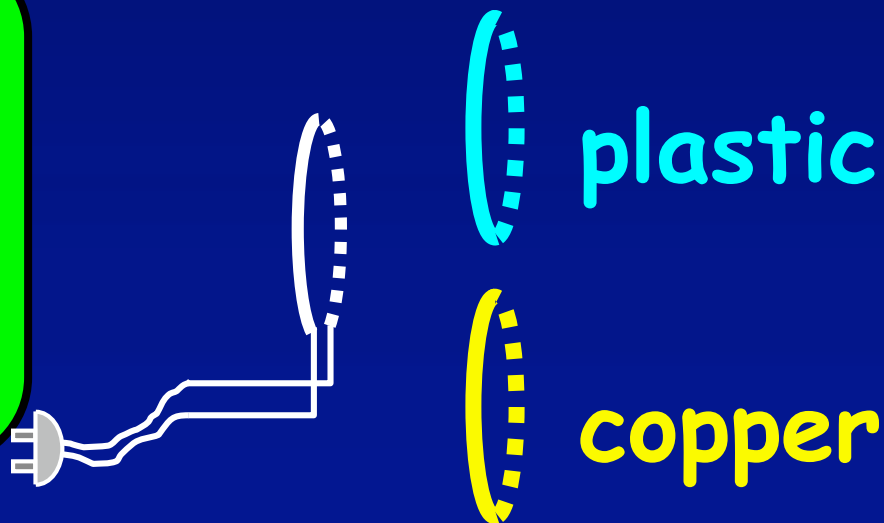
A loop with an **AC current** produces a changing magnetic field. Two loops have the same area, but one is made of **plastic** and the other **copper**. In which of the loops is the induced **voltage** greater?

- 1) the plastic loop
- 2) the copper loop
- 3) voltage is same in both

Faraday's law says nothing about the material:

$$\mathcal{E} = -N \frac{\Delta\Phi_B}{\Delta t}$$

The **change in flux** is the same (and  **$N$**  is the same), so the **induced emf** is the same.

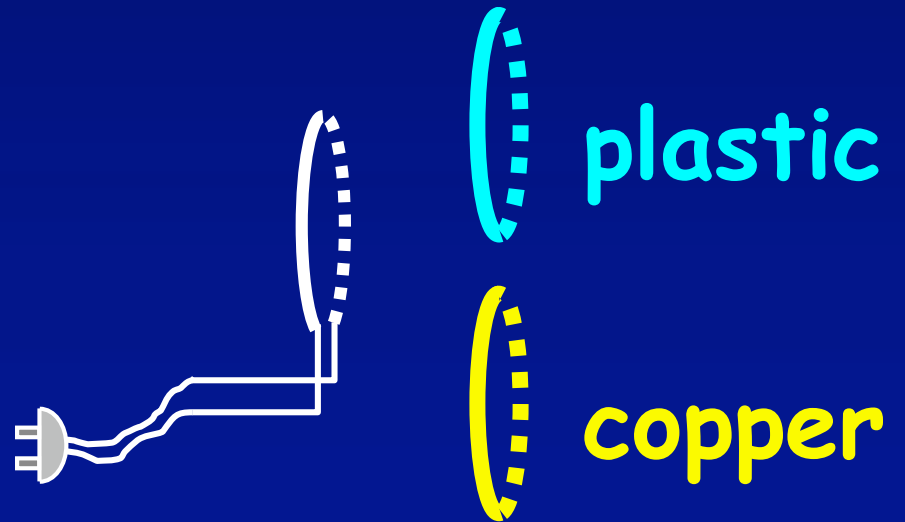


## ConceptTest 34.1b

## EM Waves II

In which of the loops is the induced current greater?

- 1) the plastic loop
- 2) the copper loop
- 3) current is same in both



## ConceptTest 34.1b

## EM Waves II

In which of the loops is the induced current greater?

- 1) the plastic loop
- 2) the copper loop
- 3) current is same in both

Remember that  $I = V/R$  (Ohm's Law), and copper has smaller resistance, so the copper loop has the greater current.

