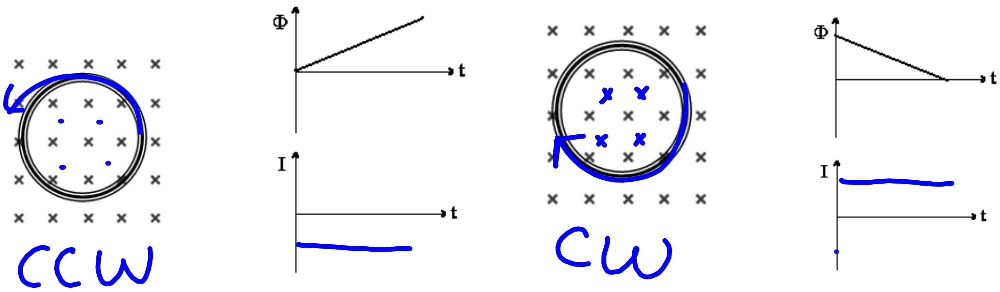
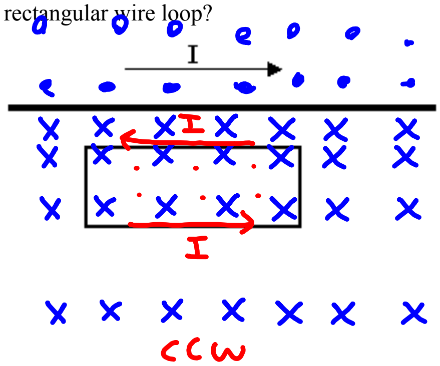
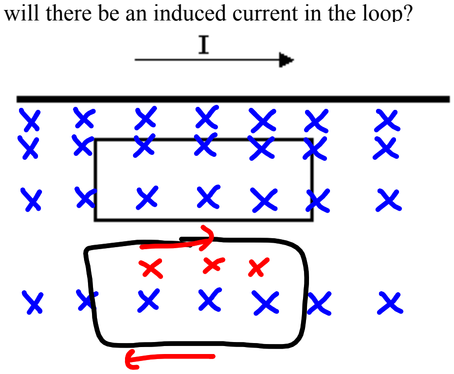
1. The diagrams show a conducting ring that is placed in a uniform magnetic field that is changing at a constant rate, as shown by the graph. Deduce the nature and direction of the induced current in each case.



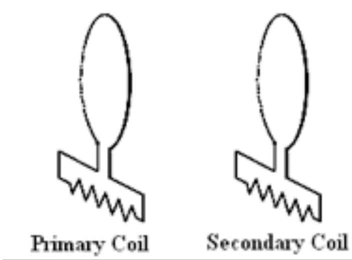

2. If the current in the wire is increasing, in which direction will there be an induced current in the rectangular wire loop?



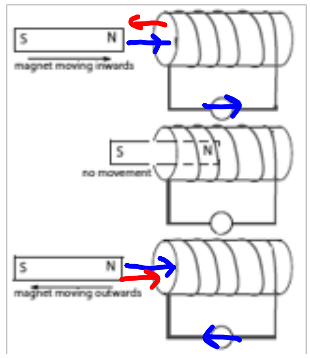

3. If the wire loop moves away from a steady current in the straight wire, in which direction will there be an induced current in the loop?



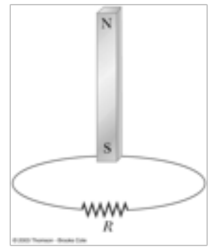
4. If a clockwise current through the primary coil is increasing with time, what effect will this have on the secondary coil?




5. Determine the direction of the current in the solenoid in each case.

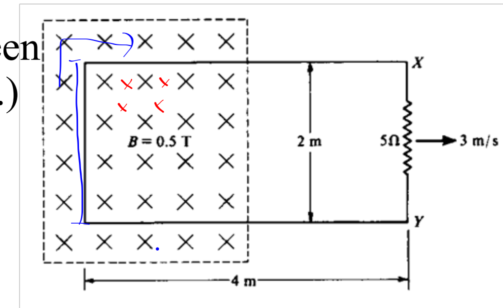



6. Determine the direction(s) of the induced current as the magnet falls through the loop.




NOTE: An emf induced by a force moving a conductor in a magnetic field (motional emf) and an emf induced by a time-changing flux (Faraday's law) are really the same phenomena explained in two different ways.

7. A wire loop as shown is pulled to the right at a constant speed of 3 m/s




a) Determine the induced emf between points X and Y. (Use motional emf.)

$\phi = BA\cos\theta$

$\mathcal{E} = Blv$

$.5\,T \cdot 2\,m \cdot 3\,m/s = 3\,V$

$\mathcal{E} = N\frac{\Delta\phi}{\Delta t} = B\frac{\Delta A}{t} = B \cdot l \frac{\Delta x}{t}$ v

b) Determine the induced emf between points X and Y. (Use Faraday's law.)

c) Determine the magnitude of the induced current.

d) Determine the direction of the induced current. (Try both methods.)