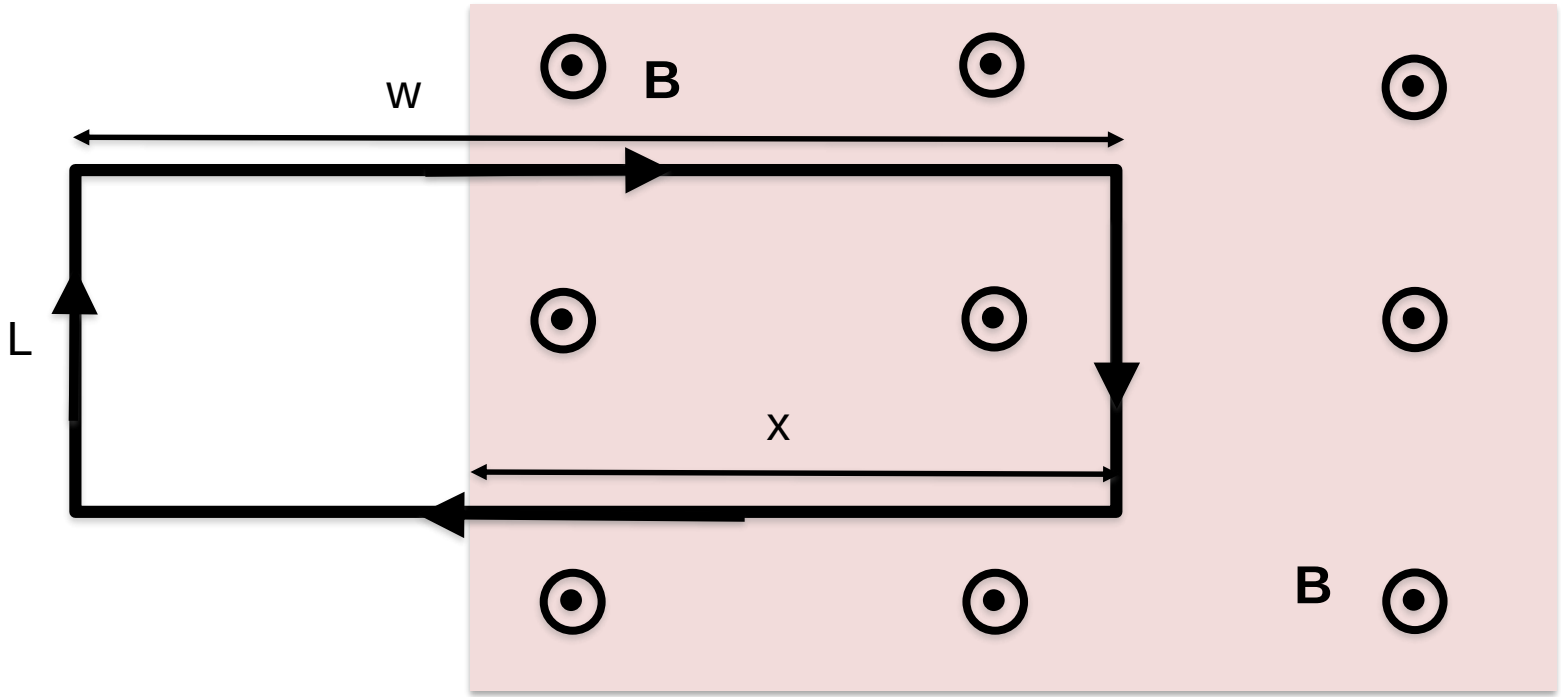
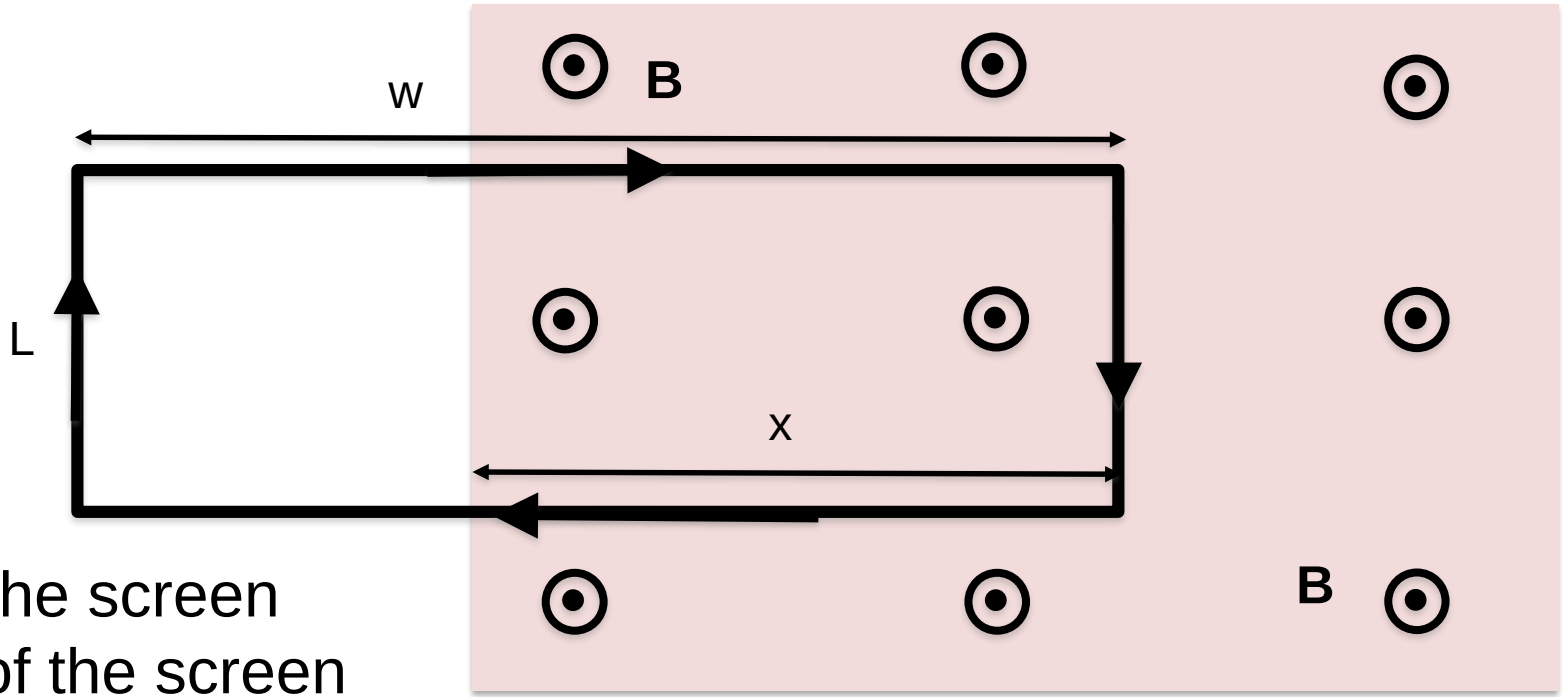
Induction

One end of stationary rectangular metal loop is in a region of uniform magnetic field **B**, which has magnitude B increasing with time as $B=B_0+kt$. What is the emf around the loop?



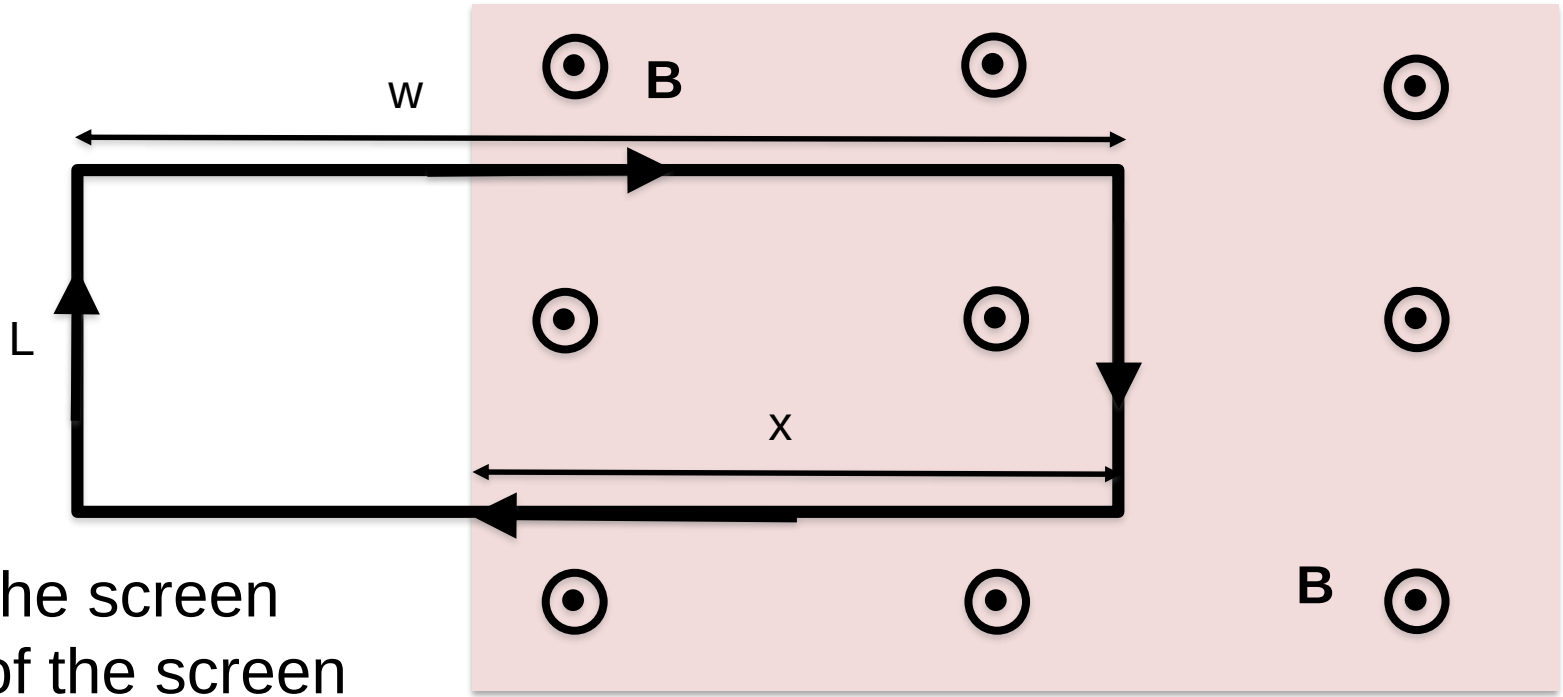
A. Lxk
B. -Lxk
C. LxB_0
D. $-LxB_0$
E. 0

One end of stationary rectangular metal loop is in a region of uniform magnetic field **B**, which has magnitude B increasing with time as $B=B_0+kt$. What is the direction of the field $\mathbf{B_{ind}}$ created by the induced current in the loop, in the plane region inside the loop?



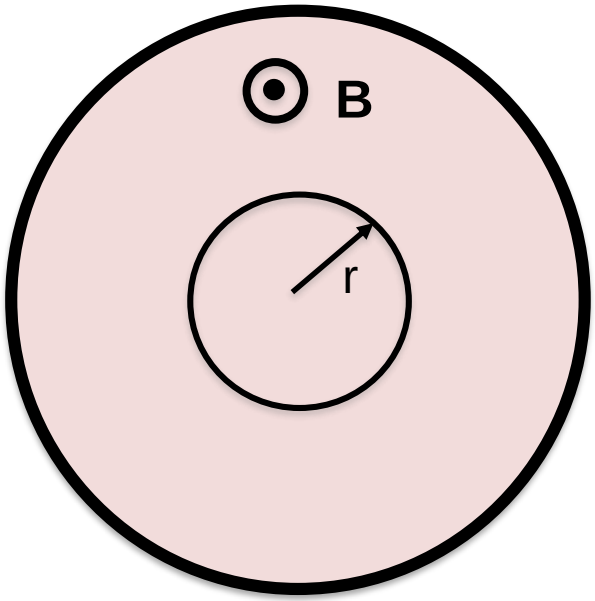
A. Into the screen
B. Out of the screen
C. To the left
D. To the right
E. Not enough information

One end of stationary rectangular metal loop is in a region of uniform magnetic field **B**, which has magnitude B *decreasing* with time as $B=B_0-kt$. What is the direction of the field $\mathbf{B}_{ind}$ created by the induced current in the loop, in the plane region inside the loop?



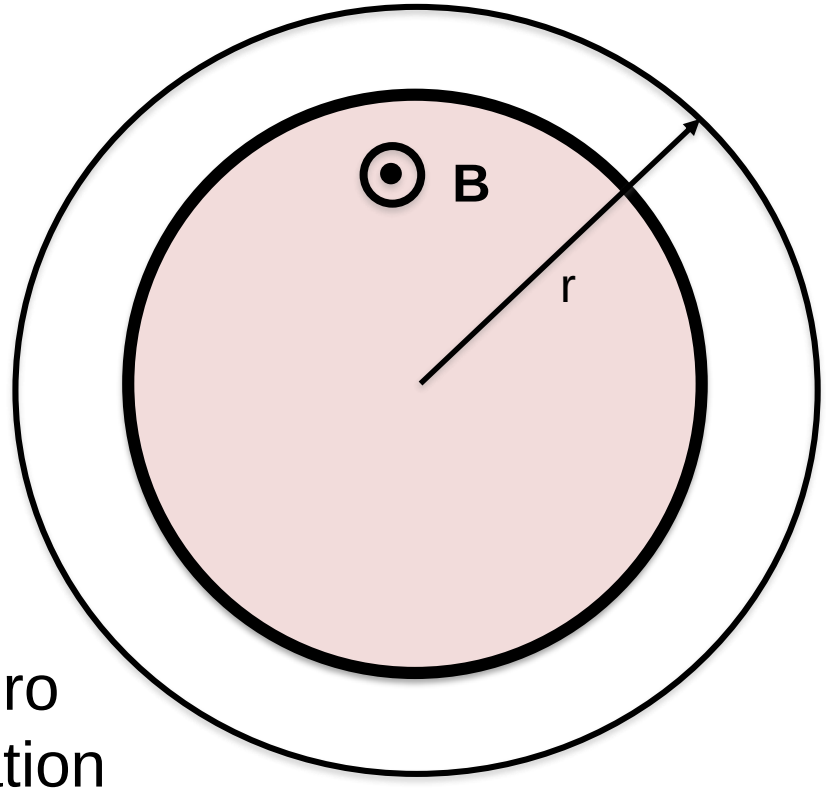
A. Into the screen
B. Out of the screen
C. To the left
D. To the right
E. Not enough information

The current in an infinite solenoid with uniform magnetic field **B** inside is increasing so that the magnitude B in increasing with time as $B=B_0+kt$. A small circular loop of radius r is placed coaxially inside the solenoid as shown. Without calculating anything, determine the direction of the field $\mathbf{B_{ind}}$ created by the induced current in the loop, in the plane region inside the loop?



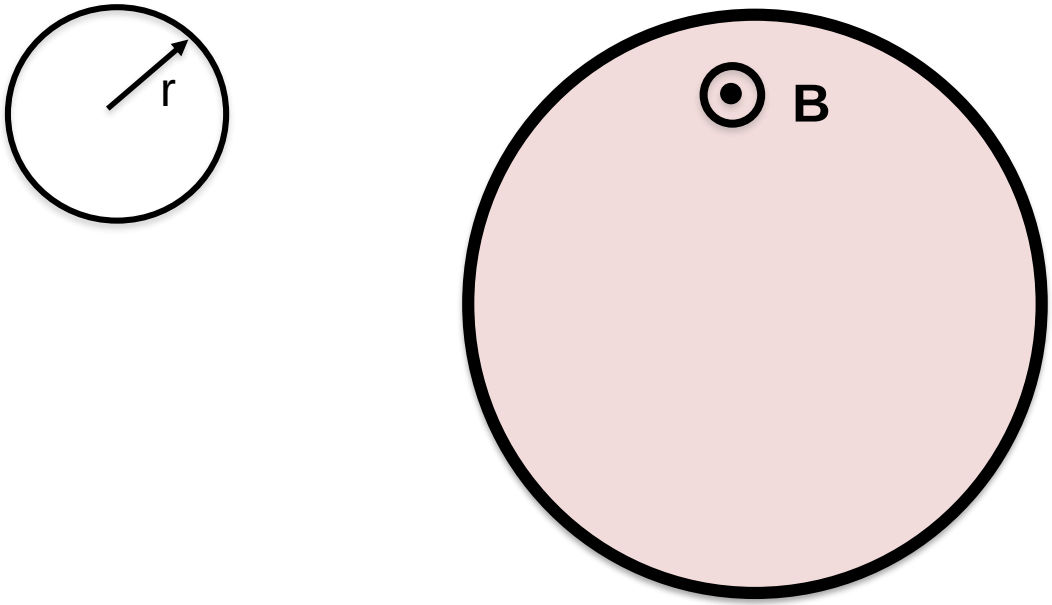
A. Into the screen
B. Out of the screen
C. CW
D. CCW
E. Not enough information

The current in an infinite solenoid with uniform magnetic field **B** inside is increasing so that the magnitude B in increasing with time as $B=B_0+kt$. A circular loop of radius r is placed coaxially outside the solenoid as shown. In what direction is the induced **E** field around the loop?



A. CW
B. CCW
C. The induced E is zero
D. Not enough information

The current in an infinite solenoid with uniform magnetic field **B** inside is increasing so that the magnitude B in increasing with time as $B=B_0+kt$. A small circular loop of radius r is placed outside the solenoid as shown. What is the emf around the small loop?



A. $k\pi r^2$
B. $-k\pi r^2$
C. Zero
D. Nonzero, but need more information for value
E. Not enough information to tell if zero or non-zero

Michael Faraday
1791 – 1867 English scientist

No formal education

main discoveries include electromagnetic induction, diamagnetism and electrolysis.

Inventions formed the foundation of electric motor and generation technology

Established that magnetism could affect rays of light, invented the idea of field lines in empty space

As a chemist, discovered benzene, nanoparticles, invented an early Bunsen burner and the system of oxidation numbers