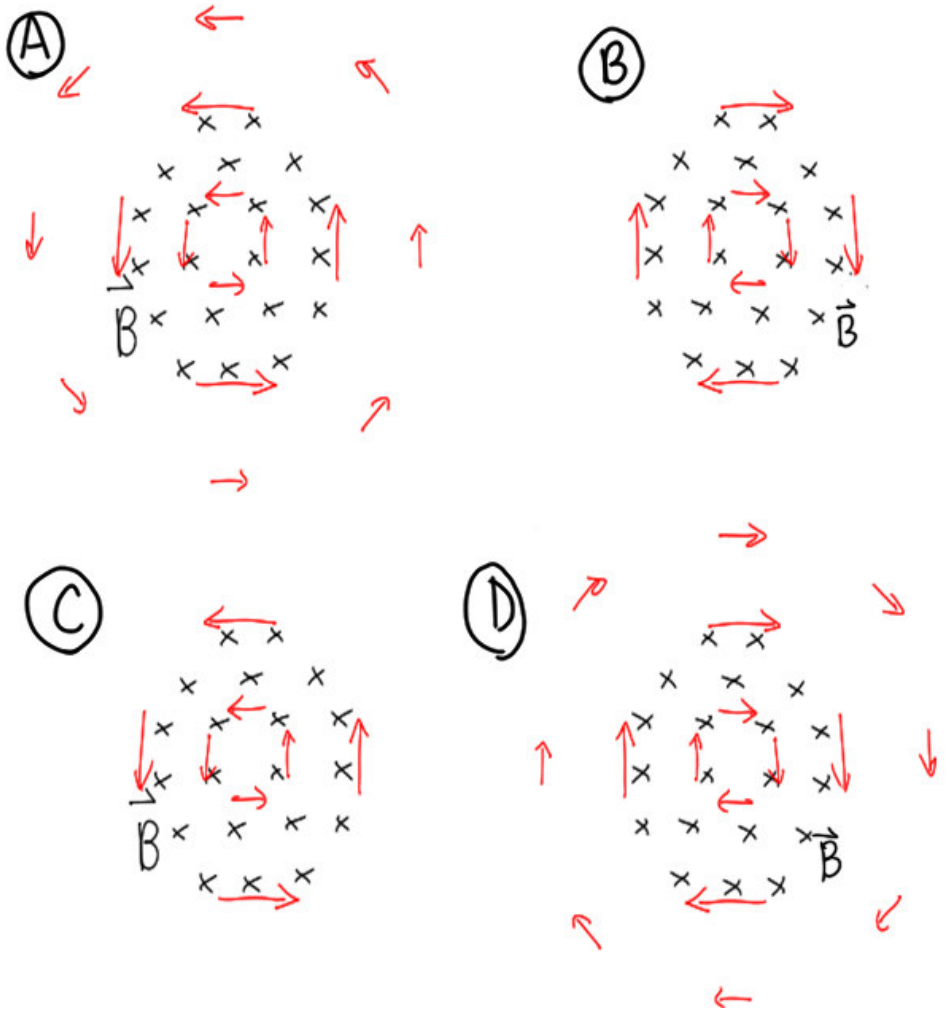
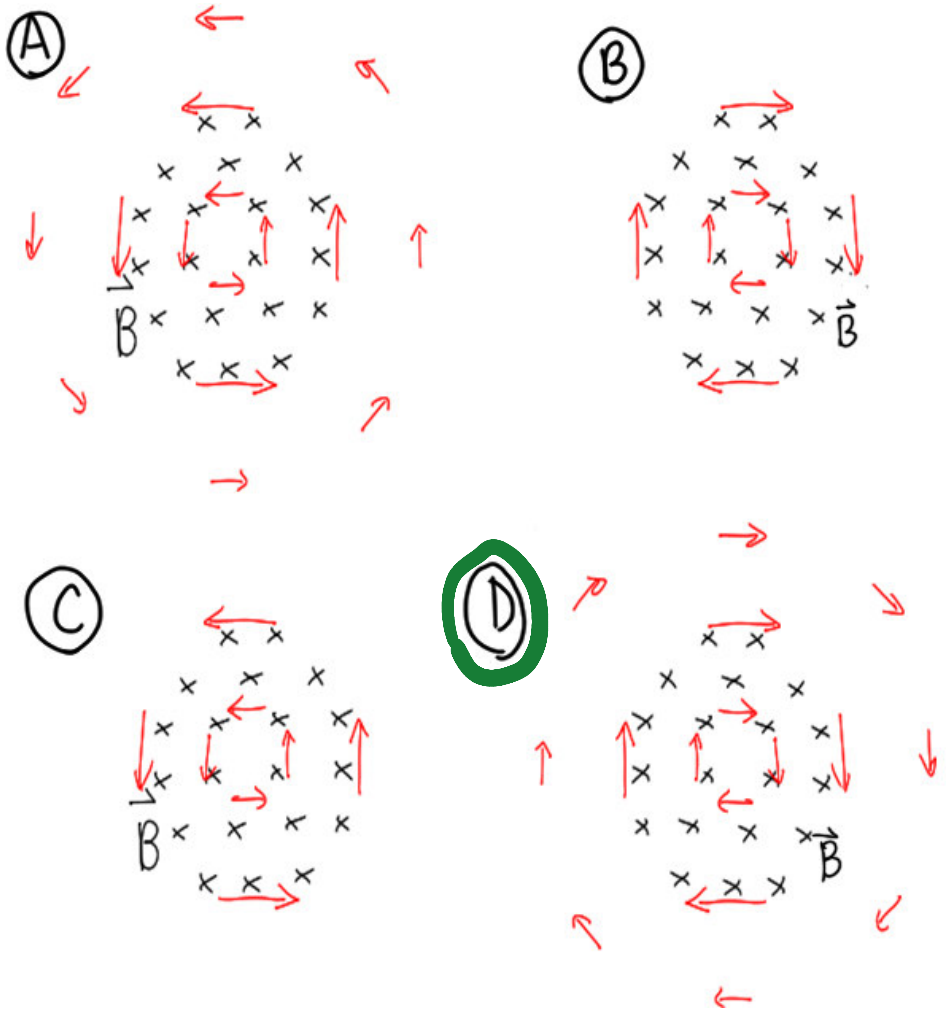
The magnetic field due to a long solenoid is shown in black in the pictures below. If the current in the solenoid is decreasing, which of the pictures best represents the induced electric field (red arrows)?



E) There is no electric field induced

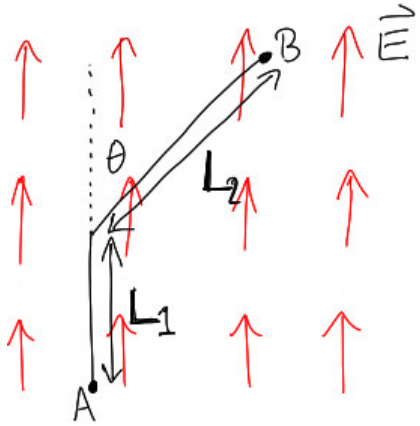
EXTRA: If the red arrows instead represented magnetic field, what could the black vectors represent? Which picture would be correct with this interpretation?

The magnetic field due to a long solenoid is shown in black in the pictures below. If the current in the solenoid is decreasing, which of the pictures best represents the induced electric field?



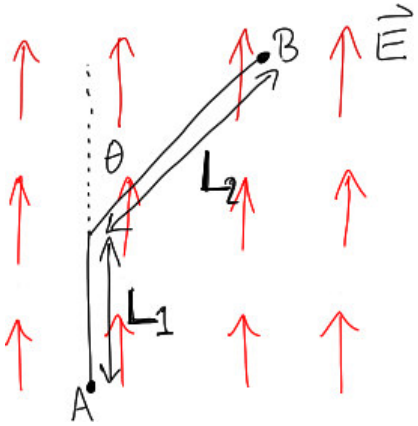
E) There is no electric field induced

In the diagram to the right, a charge Q is moved from point A to point B in a constant electric field with magnitude E. The work done by the electric field on the charge during this process is



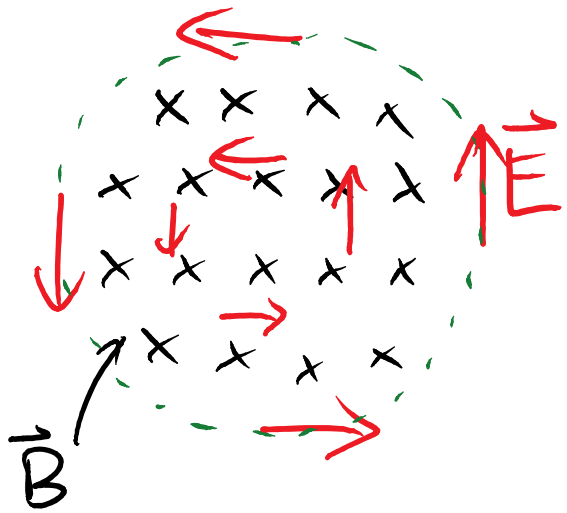
A) $E\ Q\ L_1$
B) $E\ Q\ L_1 + E\ Q\ L_2$
C) $E\ Q\ L_1 + E\ Q\ L_2 \cos(\theta)$
D) $E\ Q\ L_1 + E\ Q\ L_2 \sin(\theta)$

In the diagram to the right, a charge Q is moved from point A to point B in a constant electric field with magnitude E. The work done by the electric field on the charge during this process is



A) E Q L_1
B) E Q L_1 + E Q L_2
C) E Q L_1 + E Q L_2 cos(θ)
D) E Q L_1 + E Q L_2 sin(θ)
E) I have no idea, but for some reason I feel like pizza

The magnetic field in a solenoid of radius R is described by a function of time B(t). Determine the magnitude of the electric field at the outside of the solenoid in terms of R, B, and dB/dt.



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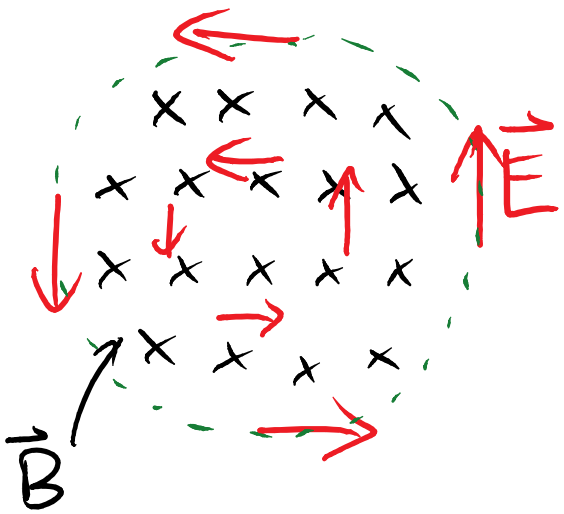

A) $R^2 \frac{dB}{dt}$

B) B

C) $\frac{1}{2} R \frac{dB}{dt}$

D) $\pi R^2 \frac{dB}{dt}$

E) None of the above

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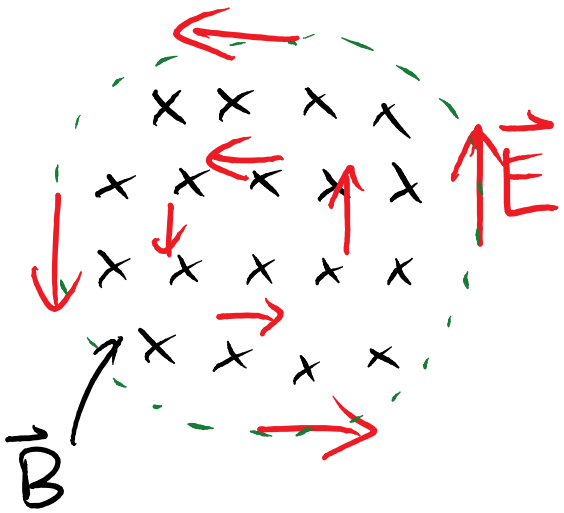


A) $R^2 \frac{dB}{dt}$

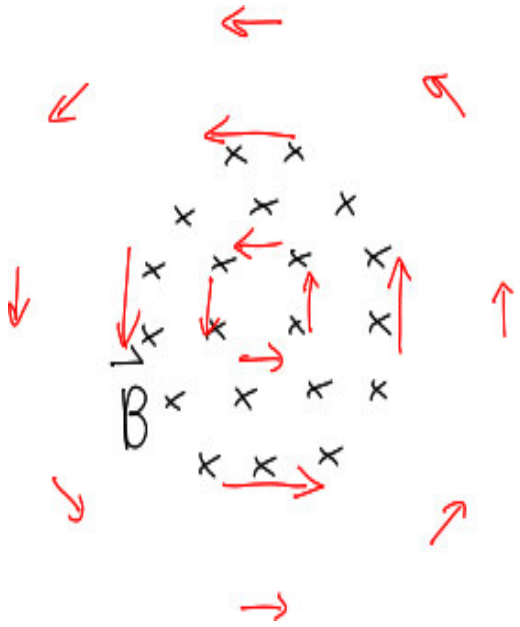
B) B

C) $\frac{1}{2} R \frac{dB}{dt}$

D) $\pi R^2 \frac{dB}{dt}$

E) None of the above

In the picture to the right, the magnetic field in the central region is produced by a solenoid. If the red arrows show an electric field that is being induced by changes in this magnetic field, we can say



A) the current in the solenoid is increasing.
B) the current in the solenoid is decreasing.
C) Either A or B are possible
D) This scenario is impossible: the electric field induced by the magnetic field should be pointing clockwise.

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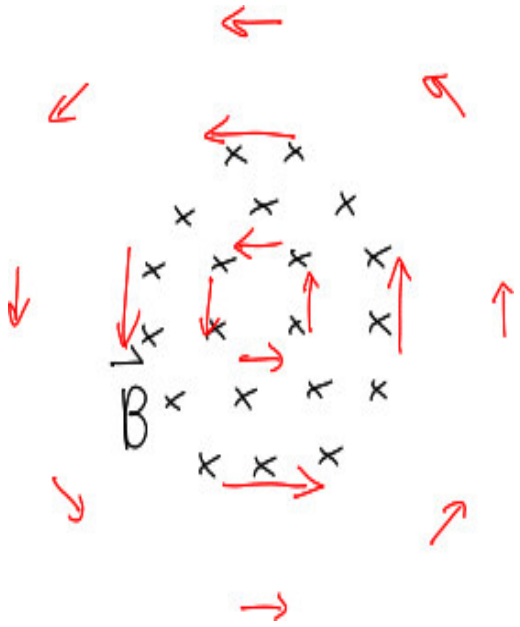

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