1. An inductor

   A) is a circuit element that stores electric potential energy

   B) is a circuit element that provides a potential difference

   C) is a circuit element that opposes changes in current

   D) is a circuit element that provides resistance to the flow of charge

   E) is a circuit element that measures the current in a circuit

2. Which combination of units can be used to express inductance?

   A) $T \cdot m^2/A$

   B) $T \cdot m/A$

   C) $T^2 \cdot m/A$

   D) $T \cdot m/A^2$

   E) $T^2 \cdot m^2/A$

3. In an *RL* circuit, $\varepsilon = 9$ V, $R = 30$ Þ, and $L = 6$ mH. How much energy is stored in the inductor's magnetic field when the current reaches its maximum steady-state value?

   A) Zero

   B) 1.6×10^{-4} J

   C) 2.7×10^{-4} J

   D) 1.6×10^{-3} J

   E) 8.1×10^{-3} J

4. When two circuits create magnetic flux through each other, what is the same for both circuits?

   A) magnetic flux

   B) current

   C) mutual inductance

   D) emf

   E) capacitance

5. Which of the following does the inductance of an inductor depend on?

   A) number of turns per length

   B) length

   C) radius

   D) physical constants

   E) all of the above

6. The Henry (*H*) is the SI unit for which of the following?

   A) potential difference

   B) magnetic field

   C) electric field

   D) current

   E) inductance

7. At equilibrium, what is the voltage across an inductor?

   A) zero

   B) infinity

   C) LI

   D) $2LI$

   E) LI^2

8. The time constant of an *RL* circuit is equal to

   A) LR

   B) L/R

   C) LR^2

   D) L^2R

   E) L^2/R

9. In an *RL* circuit as, t - !, what does the current in the circuit approach?

   A) V/R

   B) Zero

   C) Infinity

   D) LR

   E) L/R

10. After an inductor in an *RL* circuit has been connected to a battery for a very long time, a switch is flipped causing the inductor to be connected to a resistor of resistance *R*. As t - !, what does the current in the circuit approach?

    A) V/R

    B) zero

    C) infinity

    D) LR

    E) L/R

11. What is the equation for current growth in an inductor in an *RL* circuit?

    A) $I(t) = V/R$

    B) $I(t) = (1 - e^{-(R/L)t})V/R$

    C) $I(t) = (e^{-(R/L)t})V/R$

    D) $I(t) = (1 + e^{-(R/L)t})V/R$

    E) $I(t) = (e^{-(R/L)t} - 1)V/R$

12. What is the equation for current decay in an inductor in an *RL* circuit?

    A) $I(t) = V/R$

    B) $I(t) = V/R(1 - e^{-(R/L)t})$

    C) $I(t) = V/R(e^{-(R/L)t})$

    D) $I(t) = V/R(1 + e^{-(R/L)t})$

    E) $I(t) = V/R(e^{-(R/L)t} - 1)$

13. What is the equation for the magnitude of voltage across an inductor during current growth in an *RL* circuit?

    A) $V(t) = IR$

    B) $V(t) = V_0(1 - e^{-(R/L)t})$

    C) $V(t) = V_0e^{-(R/L)t}$

    D) $V(t) = V_0(1 + e^{-(R/L)t})$

    E) $V(t) = V_0(e^{-(R/L)t} - 1)$

14. What is the equation for the magnitude of voltage across an inductor during current decay in an *RL* circuit?

    A) $V(t) = IR$

    B) $V(t) = V_0(1 - e^{-(R/L)t})$

    C) $V(t) = V_0e^{-(R/L)t}$

    D) $V(t) = V_0(1 + e^{-(R/L)t})$

    E) $V(t) = V_0(e^{-(R/L)t} - 1)$

15. The voltage across an inductor is proportional to the

    A) current through the inductor

    B) the resistance of the inductor

    C) the charge on the inductor

    D) the rate of change voltage across the inductor

    E) the rate of change of current through the inductor

Answer Key
Lenz's LAw MC Questions [Mar 28, 2011]

1. C
2. A
3. C
4. C
5. E
6. E
7. A
8. B
9. A
10. B
11. B
12. C
13. C
14. B
15. E

Name _____ Class _____ Date _____

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