What is an Inductor?

Worksheet

An inductor's induced voltage is proportional to the rate of change of current through it: V = L(di/dt), where L is inductance in henries (H).

$$V = -L\frac{dI}{dt}$$

Questions

1. An inductor with L = 3H has di/dt = 2 A/s. What is the induced voltage?
A) 6 V
B) 1.5 V
C) 5 V
D) 0.67 V

2. What is the unit of inductance?
A) Farad
B) Henry
C) Ohm
D) Tesla

3. What is the formula for energy stored in an inductor?
A) E = LI
B) E = 0.5LI
C) E = L/I
D) E = I/L

4. What law explains an inductor's opposition to a change in current?
A) Ohm's law
B) Coulomb's law
C) Lenz's law
D) Kirchhoff's law

5. An inductor with L = 2H has its current change from 3A to 7A in 0.5s. Find the induced voltage.

6. A 500 mH inductor experiences di/dt = 10 A/s. Find the induced voltage.

7. Find the energy stored in a 4H inductor carrying 3A.

8. Define: What is an inductor?

9. Define: Formula for induced voltage in an inductor?

10. Define: What is the unit of inductance?

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Answer Key

1. A) 6 V - V = L (di/dt) = 3 2 = 6 V.
2. B) Henry - Inductance is measured in henries (H).
3. B) E = 0.5LI - Energy stored is E = 0.5 L I.
4. C) Lenz's law - Lenz's law says the induced EMF opposes the change that produced it.
5. i = 7 3 = 4 A t = 0.5 s V = L (i/t) = 2 (4/0.5) = 16 V
6. L = 500 mH = 0.5 H V = L (di/dt) = 0.5 10 = 5 V
7. E = 0.5 L I E = 0.5 4 3 E = 0.5 4 9 = 18 J
8. A coiled component that stores energy in a magnetic field and opposes changes in current.
9. V = L(di/dt)
10. The henry (H).

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