

BASIC ELECTRONICS

Familiarization with Inductors

Objectives Of Experiment

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At the end of the module, the student would be able to

- Explain Function of Inductor
- Explain the factors influencing inductance

Function of an Inductor

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The function of a valve is to control the amount of fluid that flows through a pipe



In an electronic circuit, the resistor is used to control the amount of current that flows through a conductor



Function of an Inductor

Another device that controls the current is the inductor ...



However unlike the resistor that affects the current uniformly at all times, the inductor only affects currents when they are changing in value.

Similarity with Capacitor

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- Rate of change of voltage in a capacitor depends upon the current through it
- Rate of change of current in an inductor depends upon the voltage applied across it.
- Like capacitive current, inductive current is not simply proportional to voltage.
- Unlike the situation in a resistor, the power associated with inductive current (V times I) is not turned into heat but is stored as energy in the inductor's magnetic field.

Equation of an Inductor

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$$V = L * di / dt$$

- L is the inductance and is measured in henry.
- Putting a voltage across an inductor causes the current to rise as a ramp
- 1 volt across 1 henry produces a current that increases at 1 amp per second

Structure of an Inductor

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It consists of a wire wound as a coil around a core. The core may consist of a air filled hollow tube or solid material

Inductance

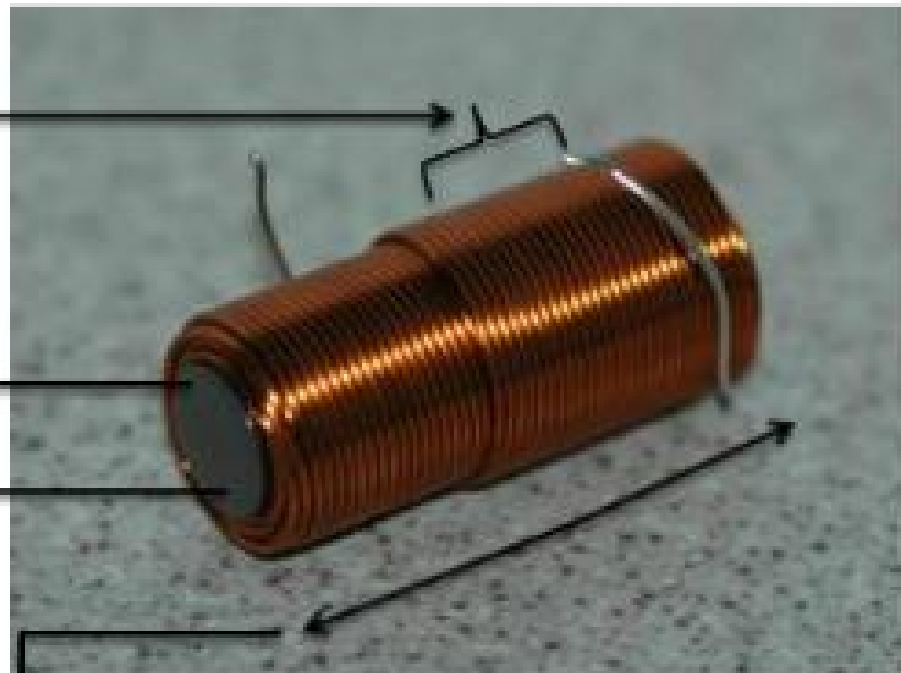
The amount of inductance in henries a coil has, is determined by the following factors -

No of turns of wire wound around the coil

Cross sectional area of the coil

The material type of the coil

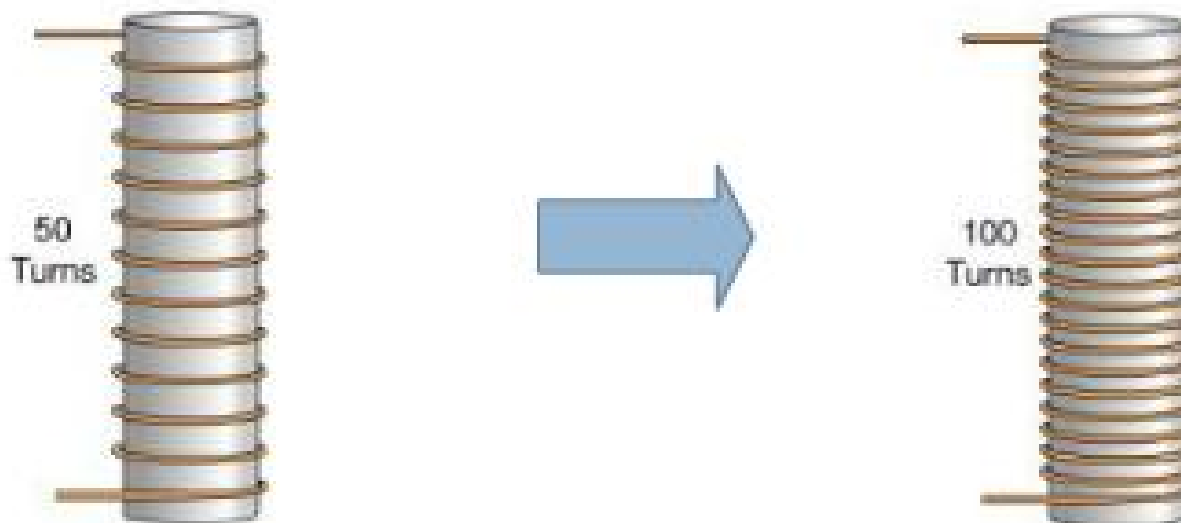
The Length of the coil



Test Question

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If the number of turns of coil around an inductor is increased (doubles), how will the inductance change ?

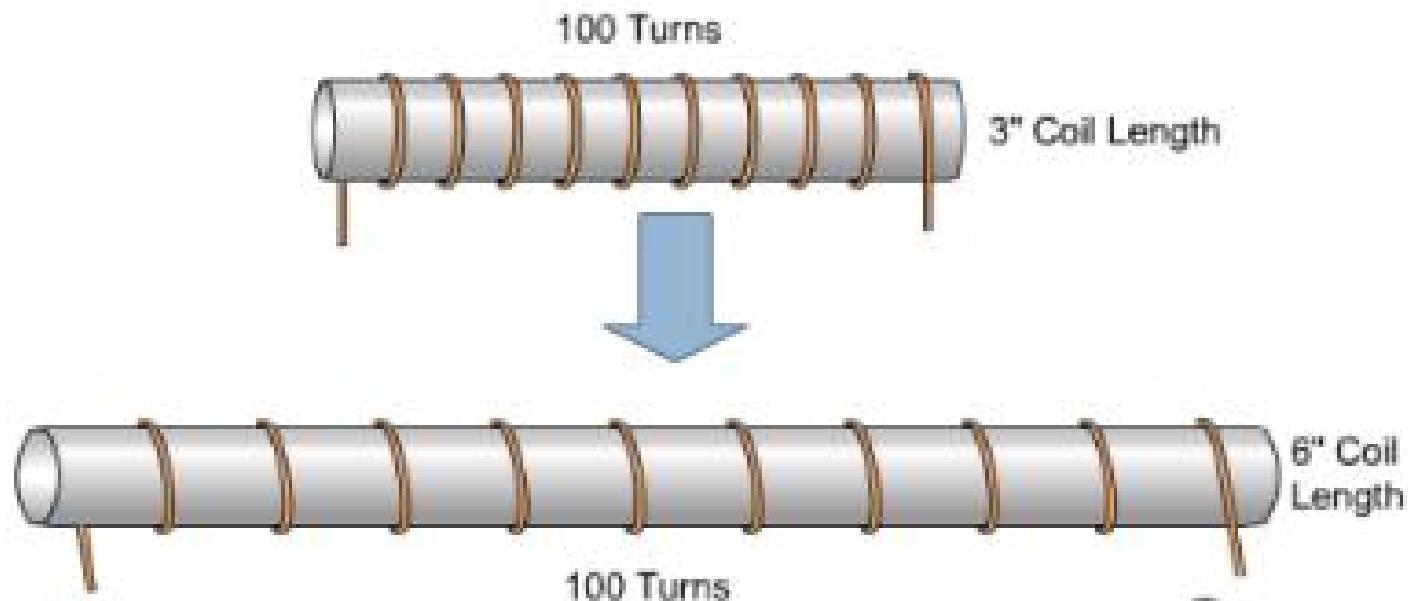


- Increase
- Decrease
- Will Not Change

Test Question

10

If the distance between the turns of coil around an inductor is increased (doubles), how will the inductance change ?

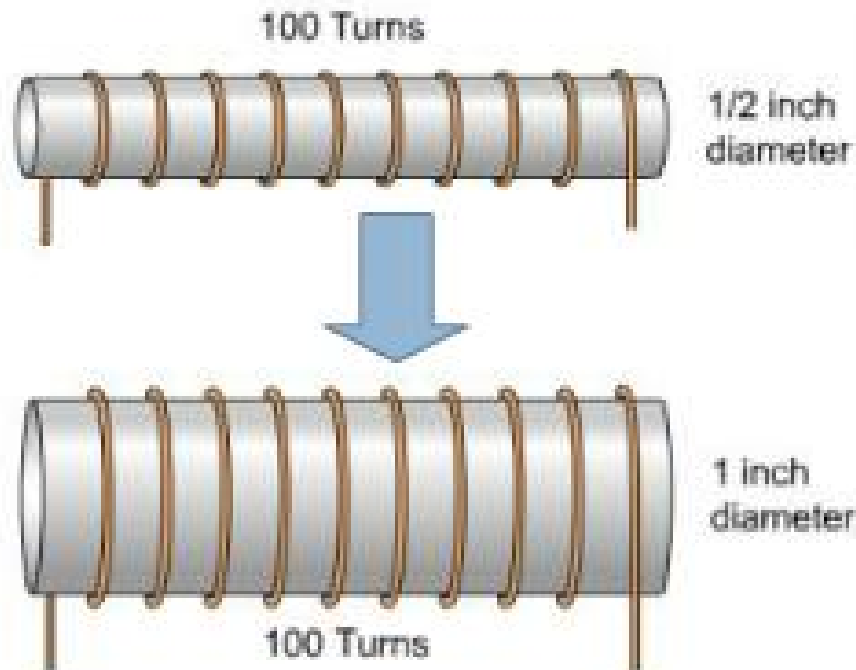


- Increase
- Decrease
- Will Not Change

Test Question

11

If the diameter of coil around an inductor is increased (doubles), how will the inductance change ?



- Increase
- Decrease
- Will Not Change

‘Inductive Kick’

An Inductor is capable of producing a momentary voltage that is much higher than the voltage of the power source that supplied the current to create its magnetic field. This temporary voltage is called an inductive kick.

Example of applications of inductive devices to provide an inductive kick is a combustion Engine ignition system that creates the spark across the gap of the spark plug

