# Chapter-7

## (Inductance & Co-efficient of Coupling)

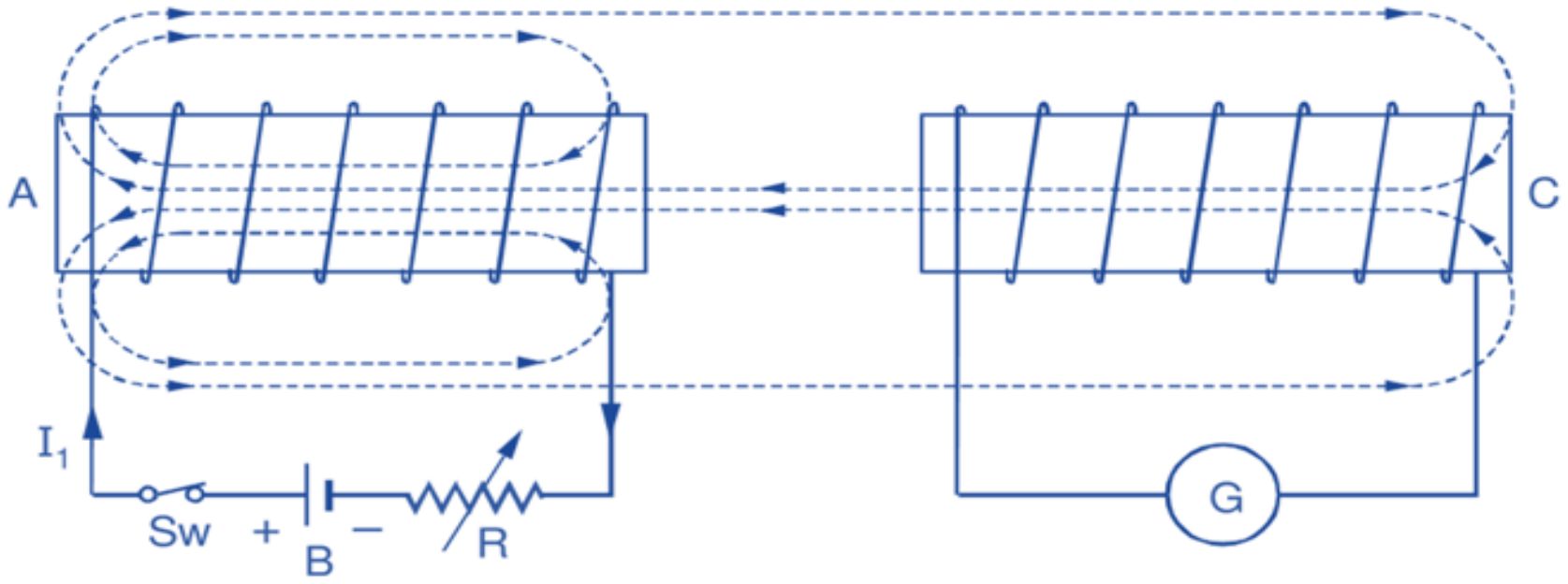
Lecture-2

# Inductance in series connection:

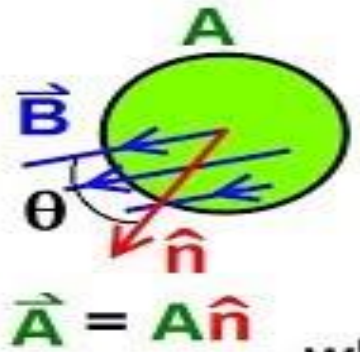
- Mutually Connected Inductors in Series

- When inductors are connected together in series so that the magnetic field of one links with the other, the effect of mutual inductance either increases or decreases the total inductance depending upon the amount of magnetic coupling.

# Mutual Inductance:



# What is Magnetic Flux?




$\vec{A} = A\hat{n}$

magnetic flux = $\Phi_B$

$\Phi_B = BA$

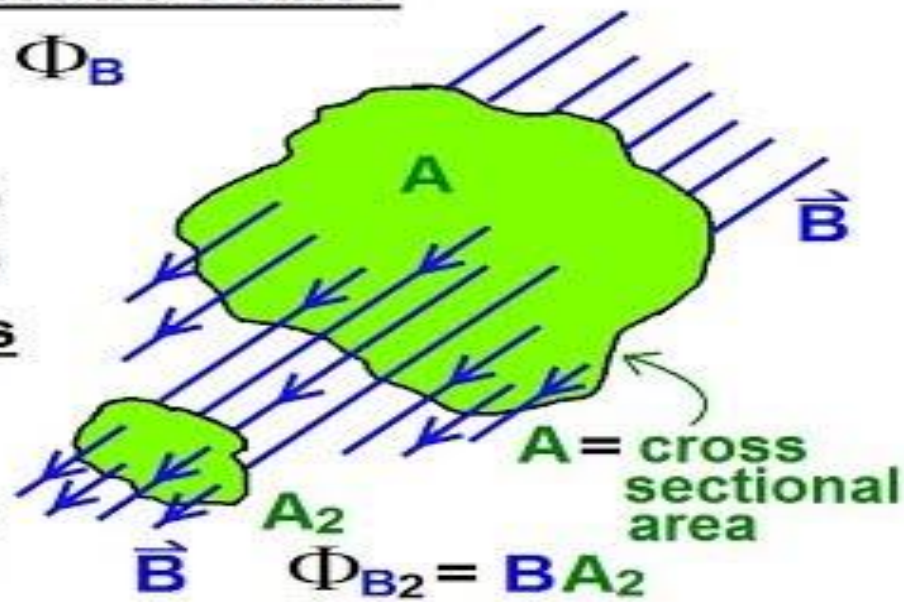
$\Phi_B = \vec{B}\vec{A}\cos\theta$

$= BA\cos\theta$

when $\Phi_B$ <u>changes</u>

(either by **B** changing or **A** changing or both)

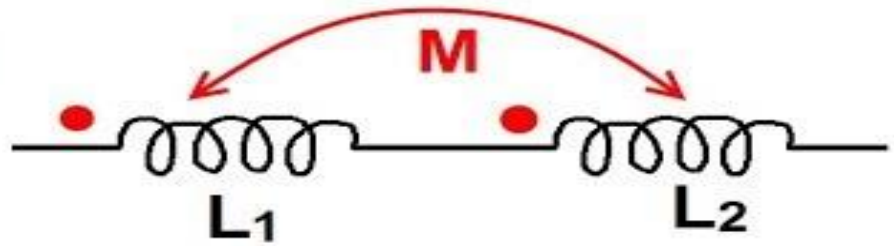
an EMF (voltage) in induced which induces a current in the loop



# Dot Convention for Inductors in Series

series aiding connection

$$L = L_1 + L_2 + 2M$$




series opposing connection

$$L = L_1 + L_2 - 2M$$