



# CBSE

# Mind Maps

# CLASS 12

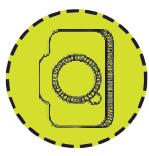
# PHYSICS



Prepare, Revise & Practice Online on  
[www.Oswaal360.com](http://www.Oswaal360.com) or on

# **mind mAPS**

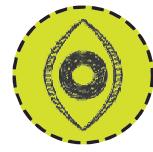
Learning MADE Simple



Presenting words and  
Concepts as Pictures!!



anytime, as frequency as you like  
till it becomes a habit!



**When?**

- To Unlock the imagination and come up with ideas
- To Remember facts and figures easily
- To Make clearer and better notes
- To Concentrate and save time
- To Plan with ease and ace exams

## **mind map** **AN INTERACTIVE MAGICAL TOOL**

**What?**

**why?**

**Result**

**How?**



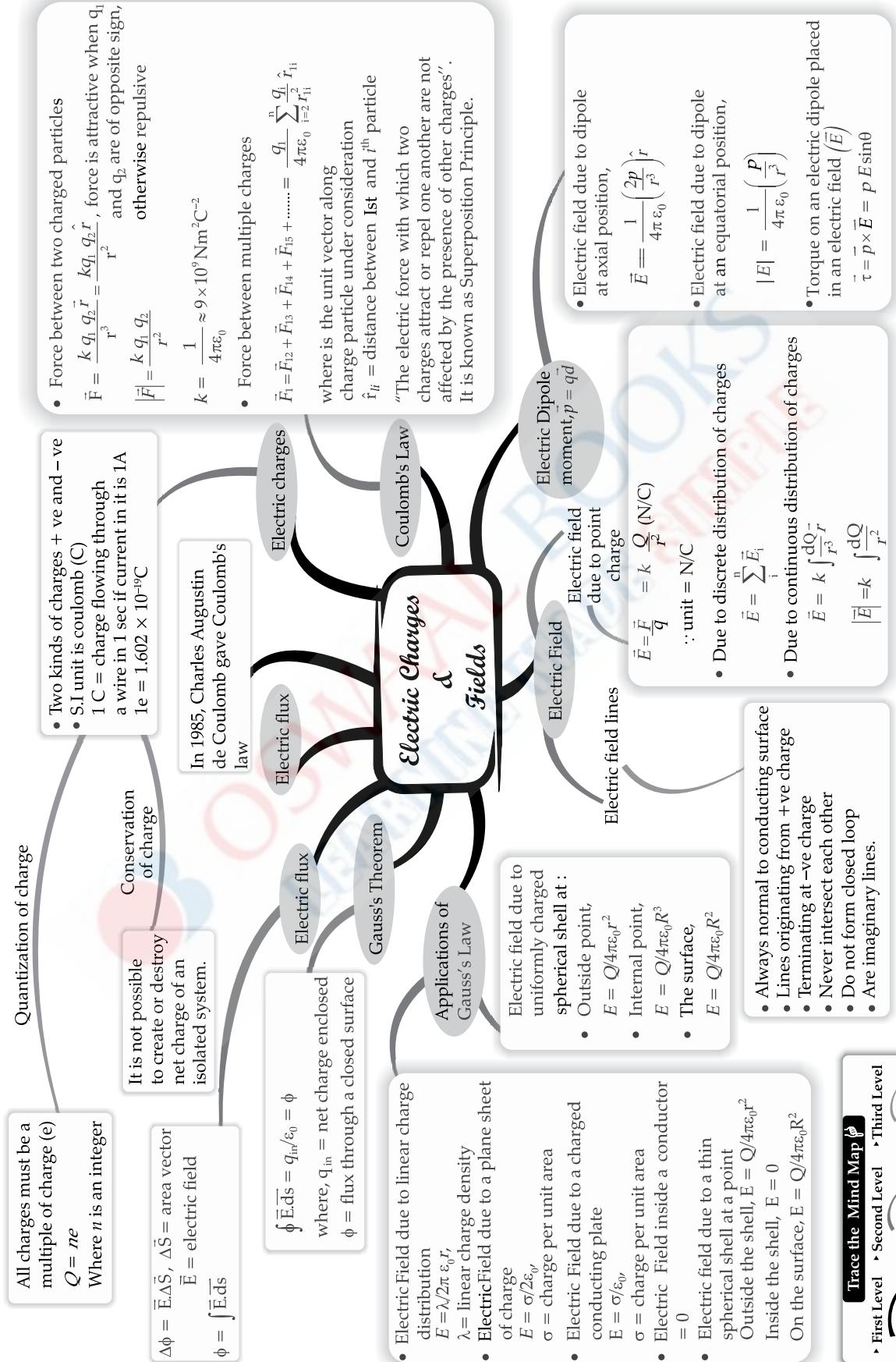
Learning made simple  
'a winning combination'

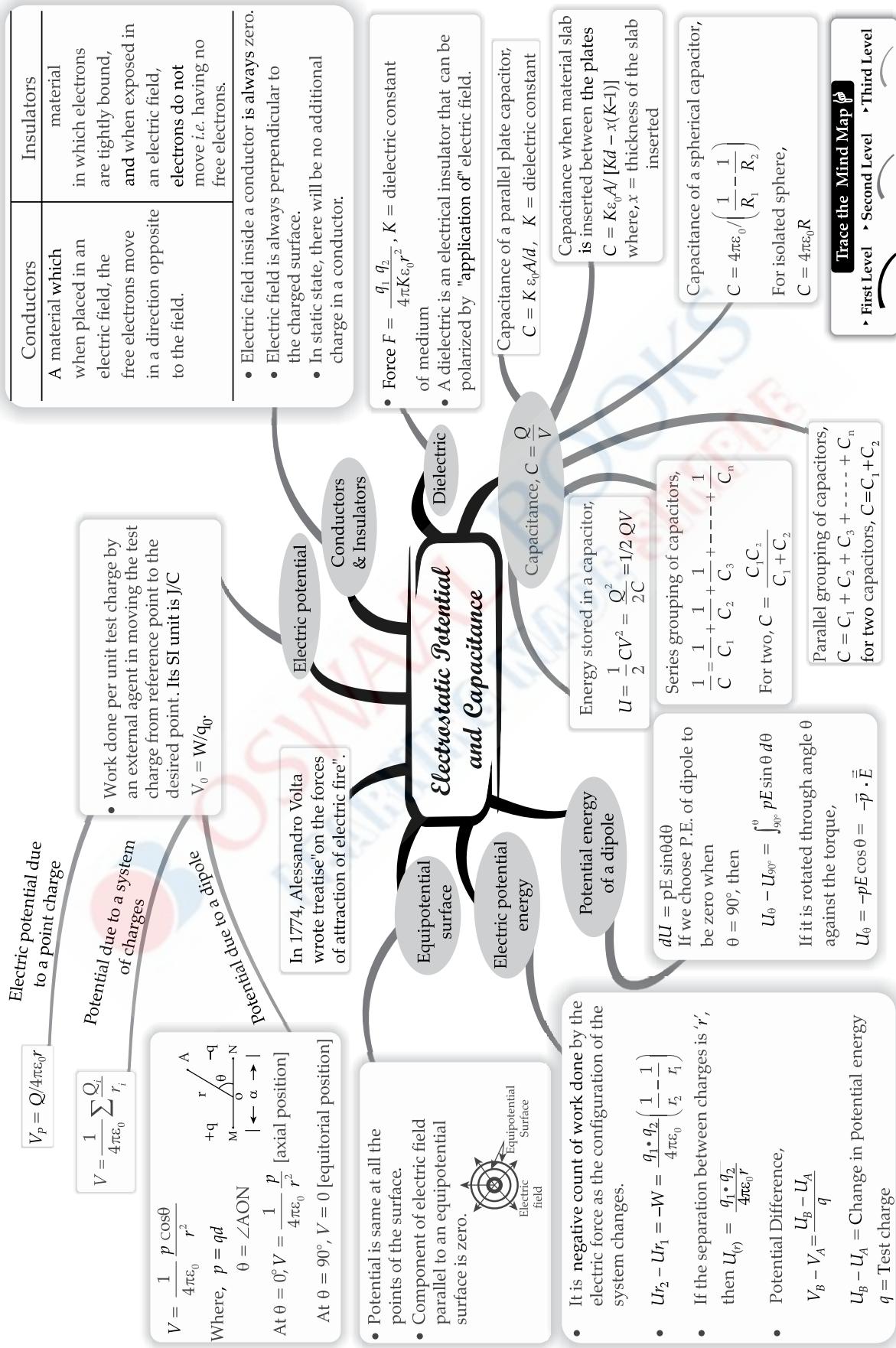


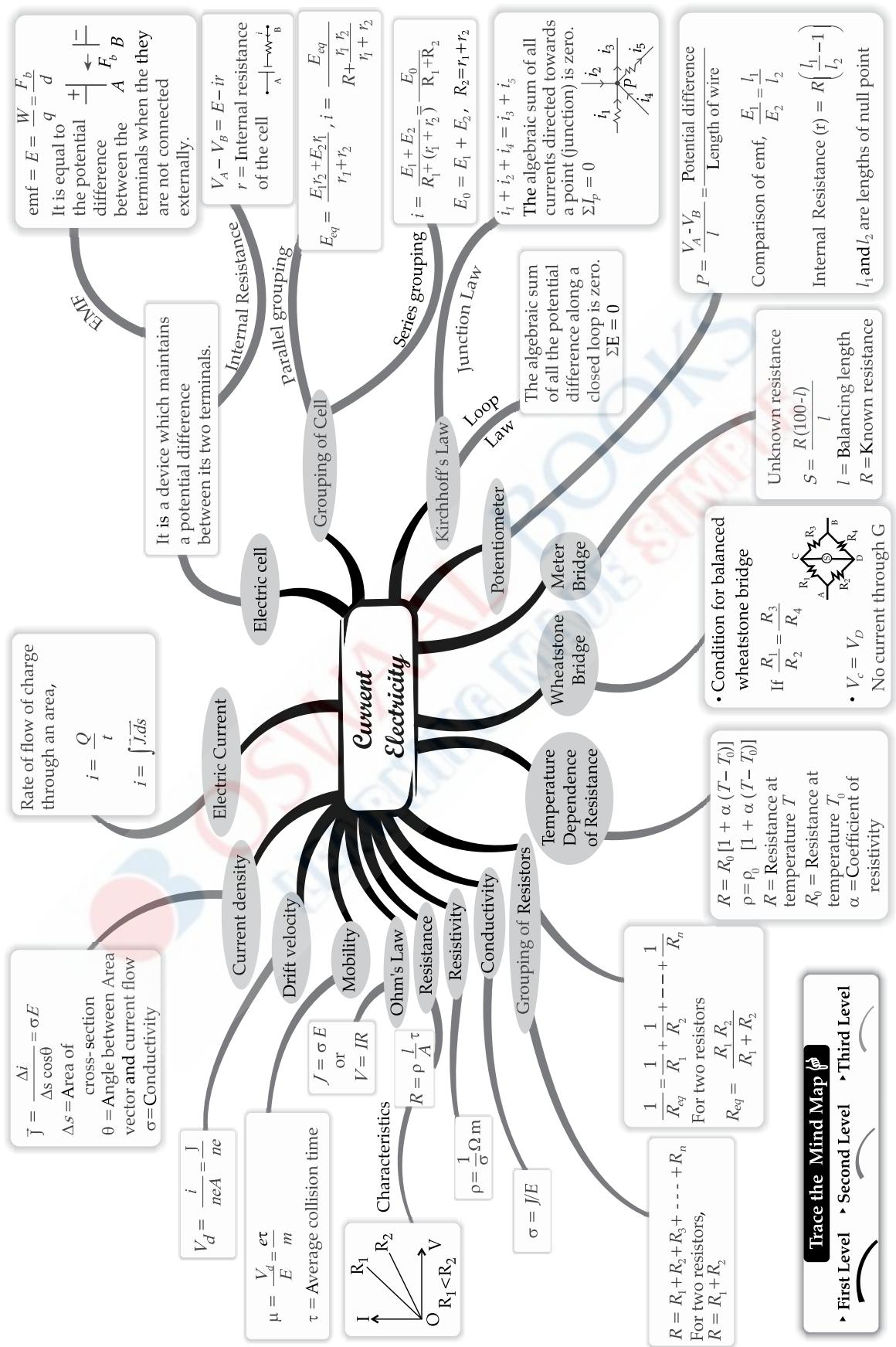
With a blank sheet of paper  
Coloured Pens and  
Your Creative Imagination!

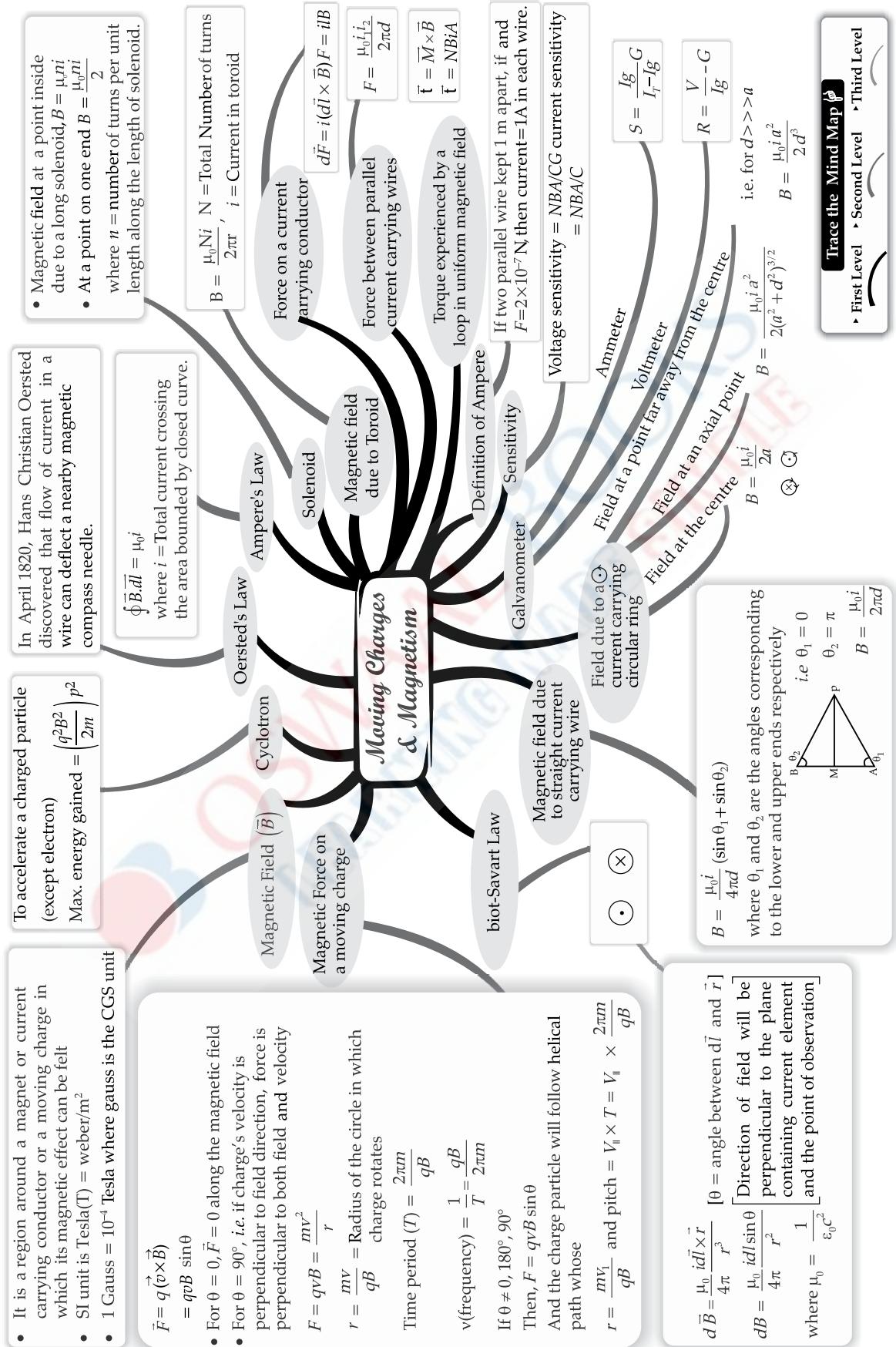
### **What are Associations?**

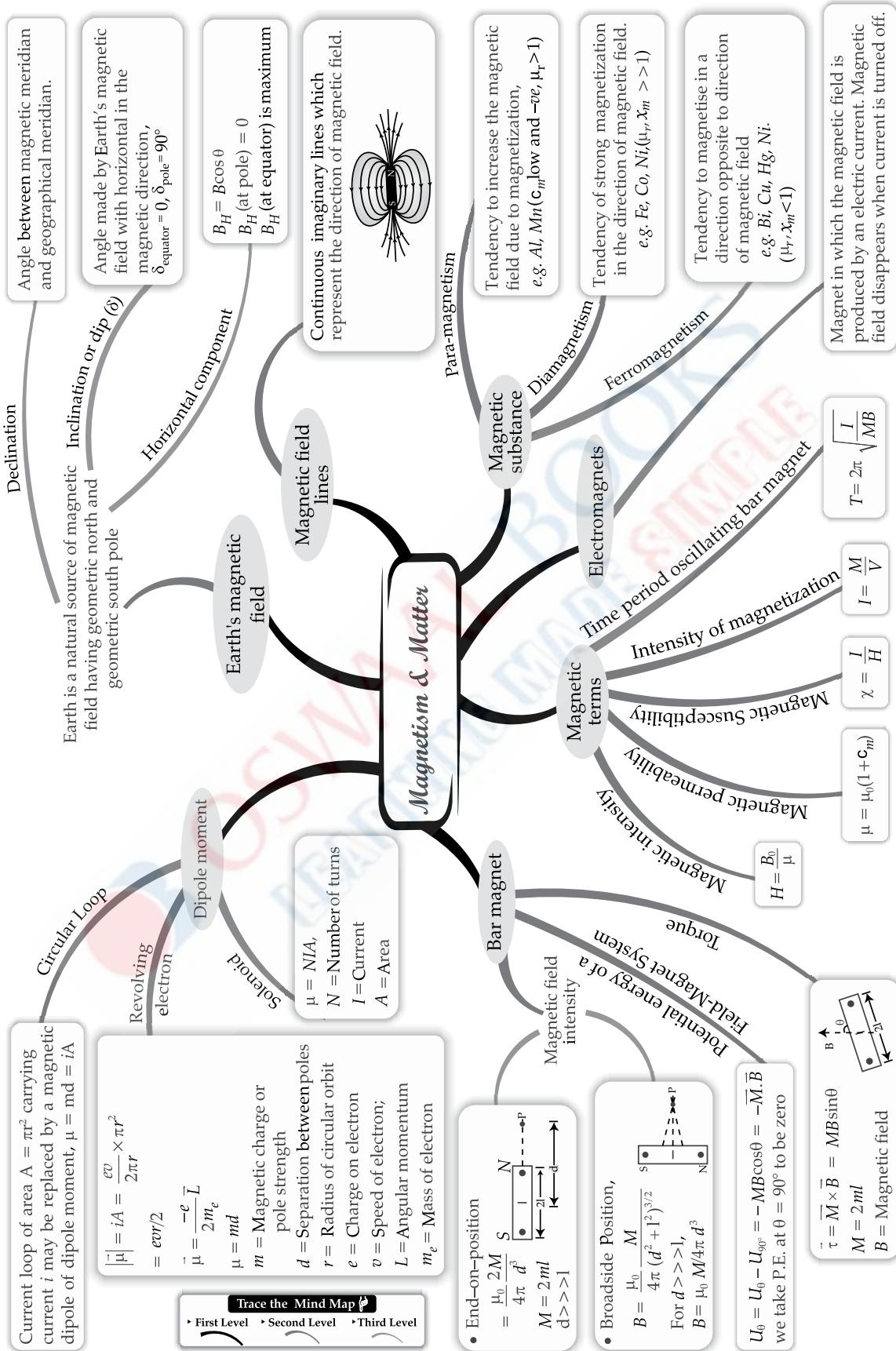
It's a technique connecting the core concept at the Centre to related concepts or ideas. Associations spreading out straight from the core concept are the First Level of Association. Then we have a Second Level of Association emitting from the first level and the chronology continues. The thickest line is the First Level of Association and the lines keep getting thinner as we move to the subsequent levels of association. This is exactly how the brain functions, therefore these Mind Maps. Associations are one powerful memory aid connecting seemingly unrelated concepts, hence strengthening memory.

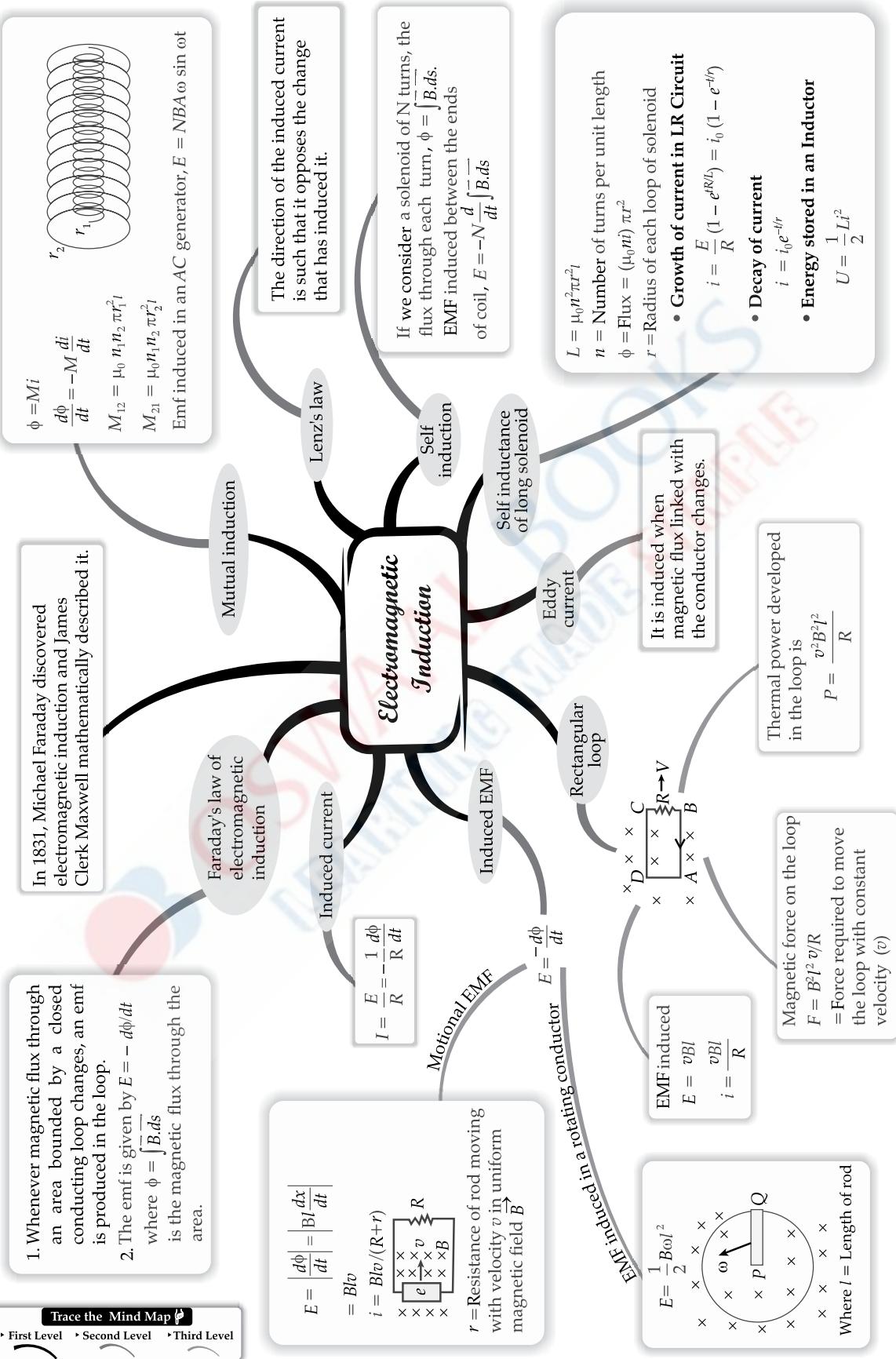






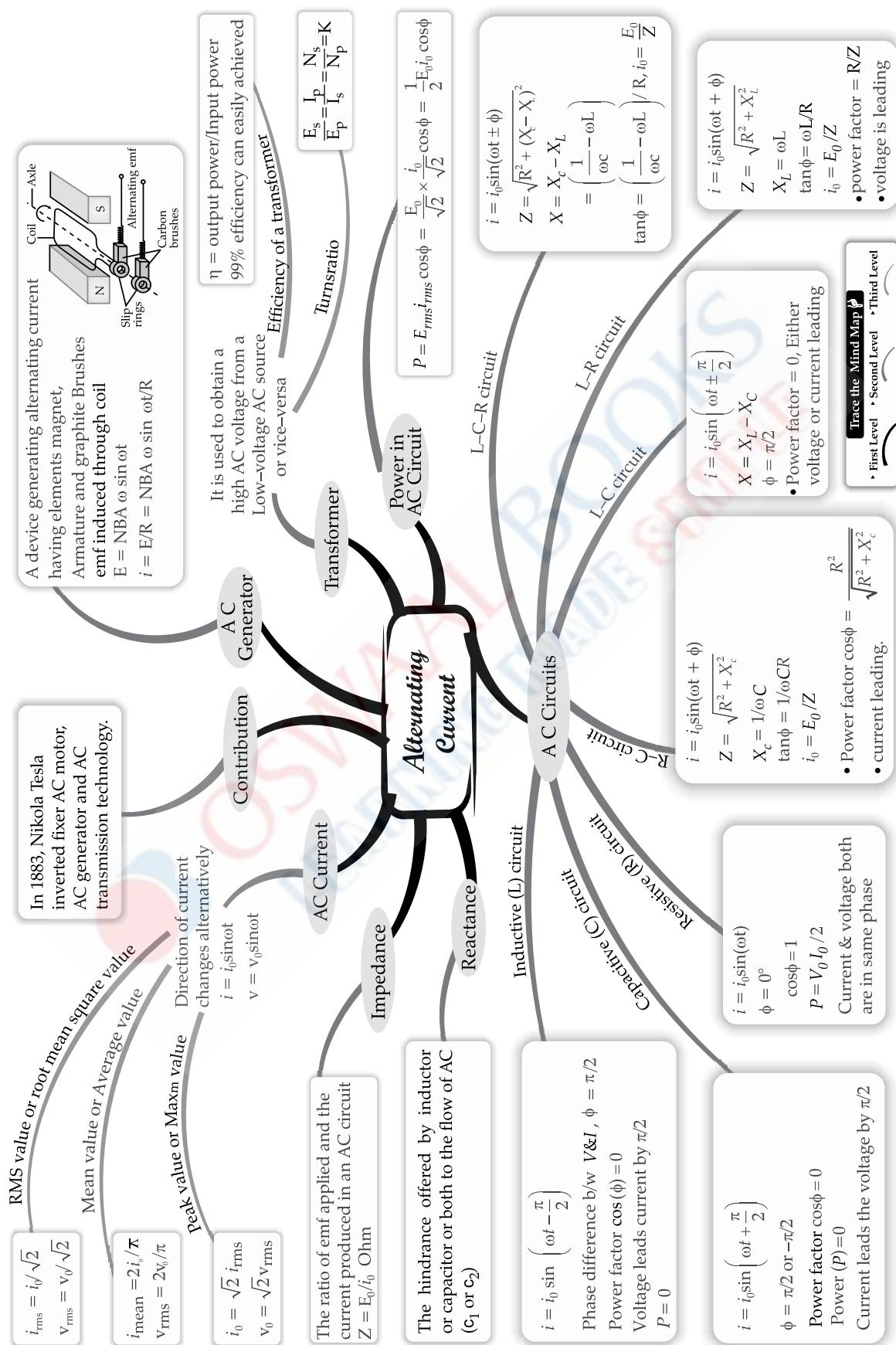


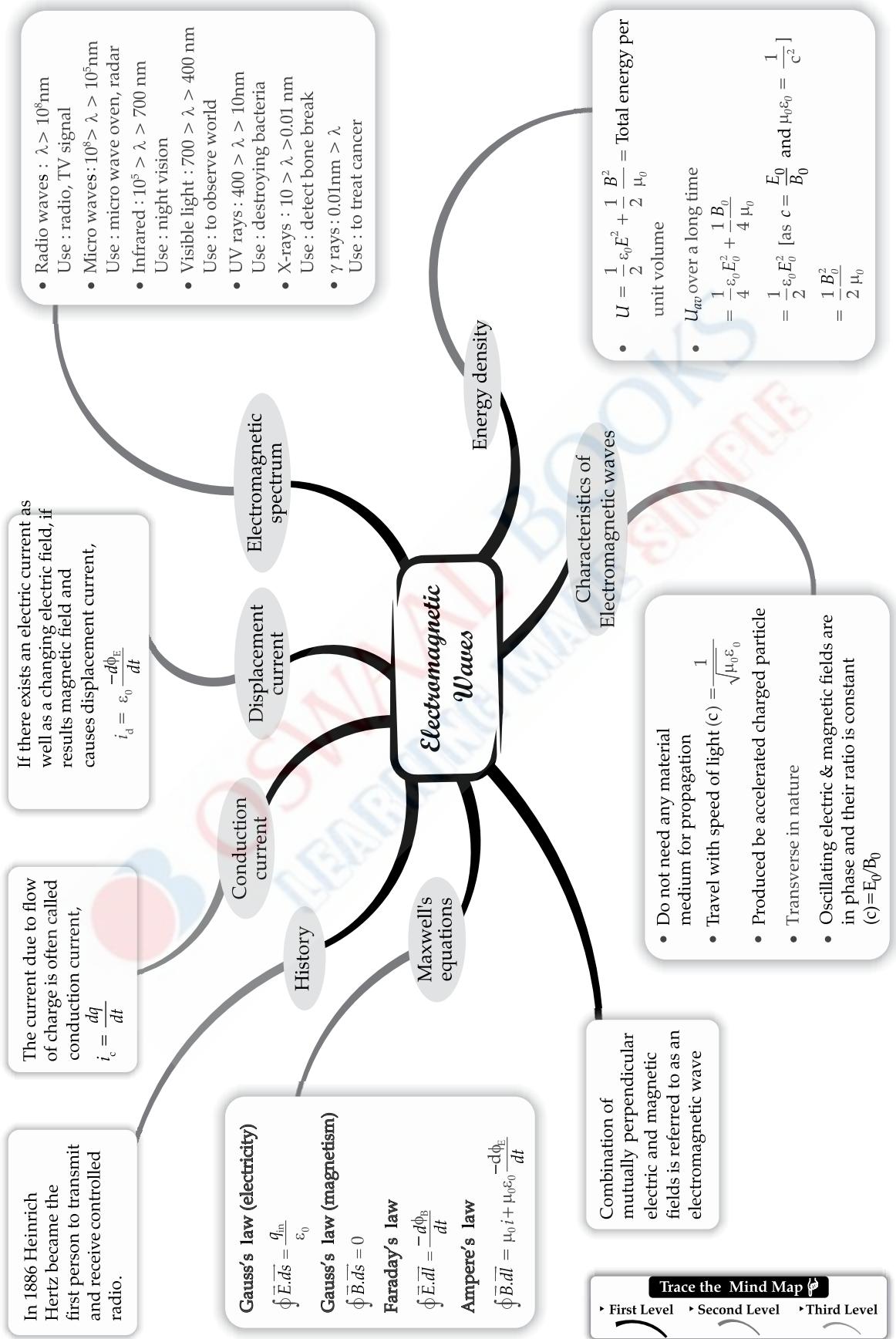


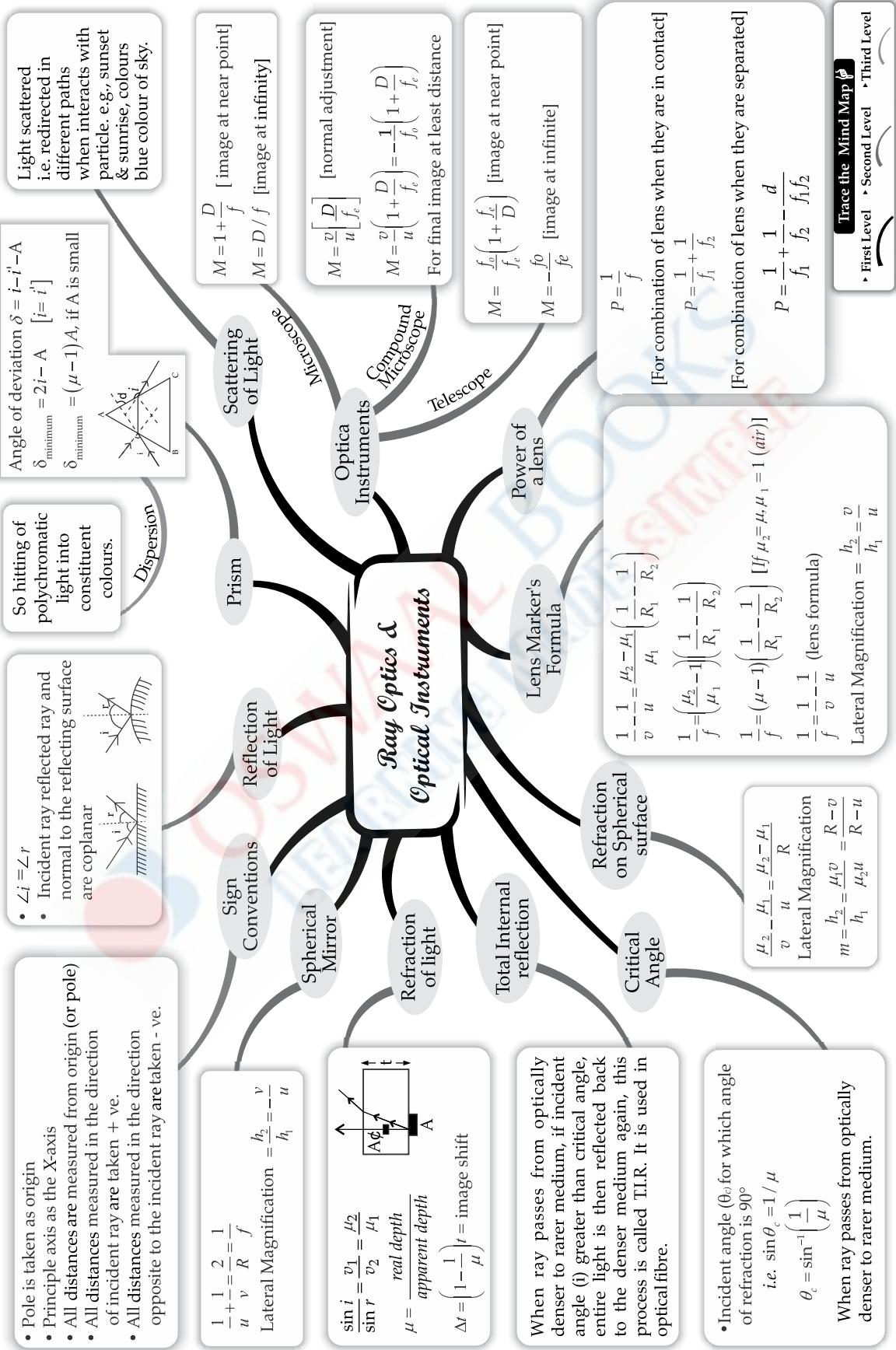


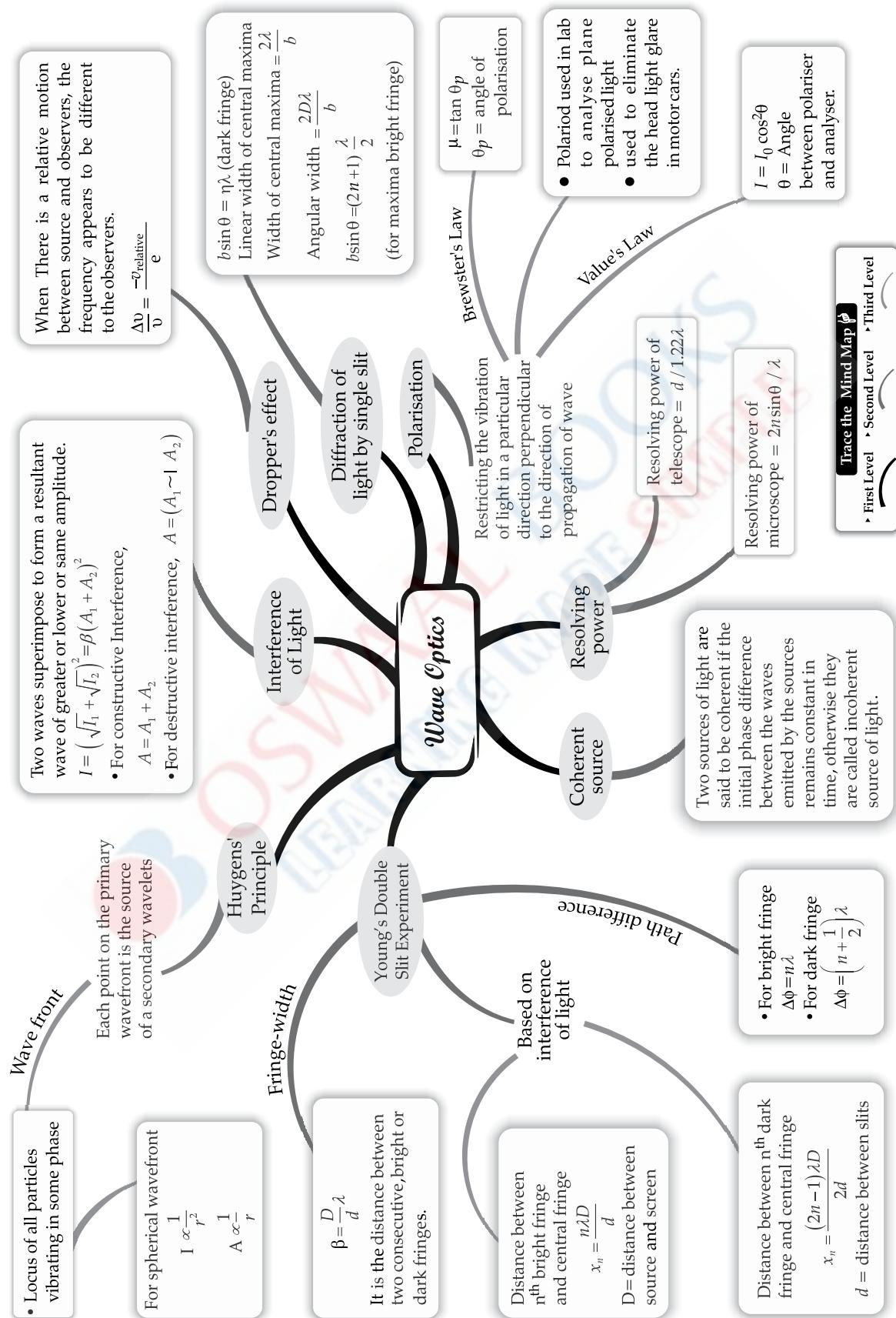
Trace the Mind Map

First Level   Second Level   Third Level









- Light has both wave character as well as particle nature
- Interference can be explained by wave nature
- When light is of sufficiently small wavelength, it behaves as particle
- Light particles having definite energy and definite linear momentum are called "photons"
- Energy of each photon =  $h\nu = hc/\lambda$ .
- Momentum of each photon =  $h/\lambda = E/c$

When light of sufficient small wavelength is incident on metal surface, electrons are ejected from the metal, the phenomenon is called photoelectric effect.

- Ejected electrons are called photoelectrons
- Minimum energy equal to work function ( $\phi$ ) must be given to an electron so as to bring it out of the metal

Einstein, after an average academic career put forward quantum theory of light in 1905 while working as a grade III technical officer in a patent office.

$$\lambda = \frac{h/p}{\text{de-Broglie's relation}}$$

$\lambda$  = wavelength associated with particle or de-Broglie wavelength  
 $p$  = momentum  
 $\lambda = \frac{h}{mv} = \frac{h}{\sqrt{2mK_{max}}}$

All matter can exhibit wave-like behaviour e.g., beam of electrons can be diffracted like a water wave

Contribution

Dual Nature of Radiation

Matter waves

## Dual Nature of Radiation & Matter

Photoelectric Effect

Einstein's Photoelectric equation

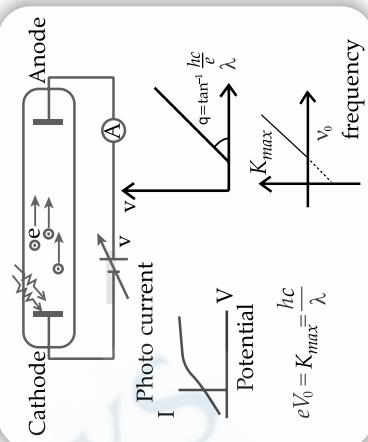
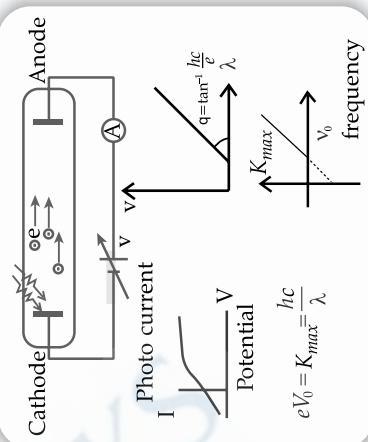
Hertz and Lenard's Observation

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- $K_{max} = E - \phi = eV_0$   
 $= \frac{hc}{\lambda} - \phi, V_0$  = stopping potential  
 $K_{max}$  = maximum kinetic energy of ejected electrons
- Here,  $\lambda_0 = hc/\phi$   
 $\lambda_0$  = Threshold Wavelength  
 $\nu_0$  = Threshold frequency  
 $K_{max} = \frac{hc}{\lambda}$

- If  $\lambda = \lambda_0 = hc/\phi$   
 $K_{max} = 0, i.e.$   
Electron may just come out onto the surface
- If  $\lambda > \lambda_0$   
*i.e.  $E < \phi$*   
no electron will come out
- If  $\lambda \leq \lambda_0$ ,  
Photoelectric effect takes place  
 $\lambda_0$  = depends on metal used



Trace the Mind Map ↗

► First Level ► Second Level ► Third Level

