- Ampere's circuital law → The line integral of the magnetic field around a closed loop is μ_0 times the current threading the surface bound by the closed loop.
  $\oint \vec{B} \cdot \vec{dl} = \mu_0 I$
- Maxwell found an inconsistency in Ampere's law, and suggested the existence of an additional current, called displacement current, to remove this inconsistency. This displacement current is due to a time-varying electric field, and is given by
  $i_d = \varepsilon_0 \frac{d\phi_E}{dt}$
- Maxwell's equations:
  First equation → $\oint \vec{E} \cdot \vec{ds} = \frac{q}{\varepsilon_0}$
  Second equation → $\oint_s \vec{B} \cdot \vec{ds} = 0$
  Third equation → $\oint_C \vec{E} \cdot \vec{dl} = -\frac{d\phi_B}{dt}$
  Fourth equation → $\oint \vec{B} \cdot \vec{dl} = \mu_0 i_c + \mu_0 \varepsilon_0 \frac{d\phi_E}{dt}$
- The speed of electromagnetic waves is given by
  $C = \frac{1}{\sqrt{\mu_0 \varepsilon_0}}$,
  Where,
  μ_0 → Permeability of free space
  ε_0 → Permittivity of free space
  In material medium, the speed of light is given by
  $v = \frac{1}{\sqrt{\mu\varepsilon}}$
  Where, μ is the permeability of the medium and ε its permittivity
- The rate of transfer of electromagnetic energy per unit area is represented by a quantity called poynting vector $\vec{S}$. The direction of $\vec{S}$ at any point gives the direction of energy transport at that point. Its SI unit is Wm^{-2}.
  $\vec{S} = \frac{1}{\mu_0} \vec{E} \times \vec{B}$
- An electromagnetic wave carries linear momentum with it. If a portion of an electromagnetic wave has energy U, then the linear momentum carried by this portion of the wave is $p = \frac{U}{c}$.
- Intensity of electromagnetic wave is
  $I = \frac{1}{2} \varepsilon_0 E_0^2 c$

- Different electromagnetic waves:

-	Type	Wavelength range
(a)	Radio waves	>0.1 m
(b)	Microwave	0.1 m to 1 mm
(c)	Infra-red	1 mm to 700 nm
(d)	Visible light	700 nm to 400 nm
(e)	Ultra-violet	400 nm to 1 nm
(f)	X-rays	1 nm to 10^{-3} nm
(g)	Gamma rays	$<10^{-3}$ nm