Electromagnetic Theory

→ Vector algebra.
→ co-ordinate system.
→ vector calculus.
→ Electrostatics
→ Magnetostatics
→ Time Varying fields ⟶ Time Varying Electric and Magnetic field.

Physical Quantity :

Every physical quantity has been divided into three parts.

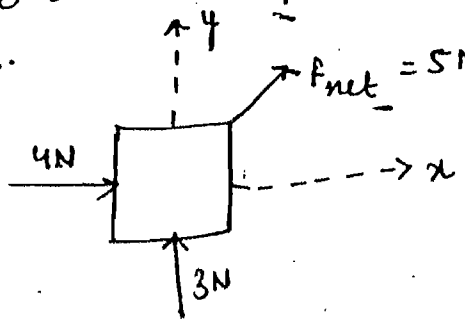
1) Scalar.
2) Vector.
3) Tensor

Scalar Quantity :- The physical quantity having only magnitude and having no association with orientation

- To represent a scalar quantity, following representations are used.

  Eg : Energy → E
  Potential → V

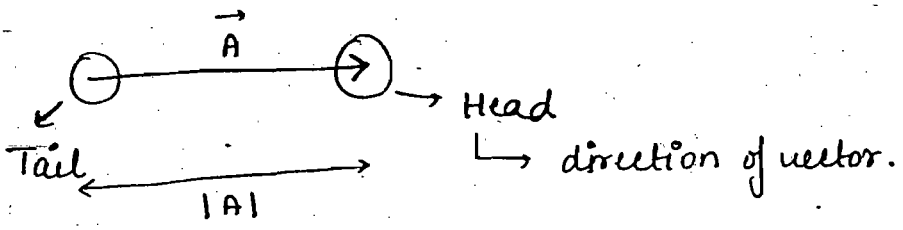
Vector Quantity :- The physical quantity having magnitude and direction may be a vector quantity if it follows vector law of addition.



Eg: Electric field Intensity : $\vec{E}$
Magnetic field Intensity :

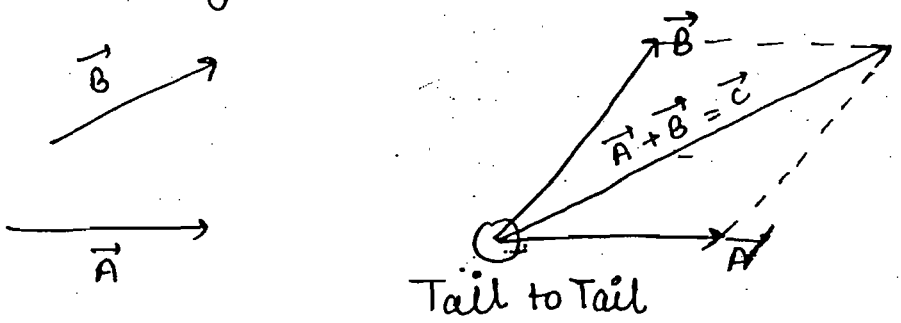
Vector Law of addition :

Representation of a vector in graphical form :



$\vec{A} = |\vec{A}|$ direction

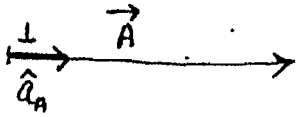
① Parallelogram law :



$$\vec{C} = \vec{A} + \vec{B}$$

$$|\vec{C}| = \sqrt{|\vec{A}|^2 + |\vec{B}|^2 + 2|\vec{A}||\vec{B}|\cos\theta_{AB}}$$

② **Unit Vector** : unit vector is having unity magnitude and direction of the vector it-self.



$$\hat{a}_A = \frac{\vec{A}}{|\vec{A}|}$$

unit-vector represents the direction of vector.