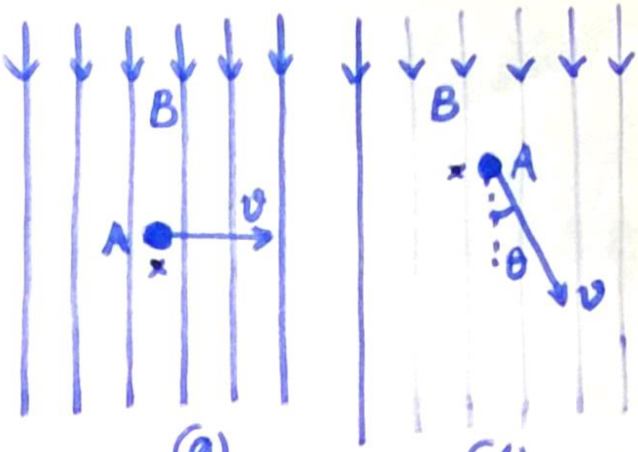
Dynamically induced emf :



(a) (b)

In fig (a), a conductor A is shown lying within a uniform magnetic field of flux density B Wb/m^2. The arrow attached to A shows its direction of motion. Suppose l is its length lying within the field and it moves a distance dx in time dt. Then area swept by it is $l \cdot dx$. Hence, flux cut $= B \times l \cdot dx$ Wb. $= d\phi$

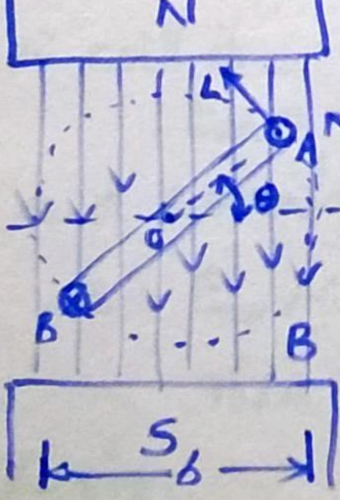
According to Faraday's laws, the emf induced

$$e = \frac{d\phi}{dt} = Bl\frac{dx}{dt} = Blv \text{ volt.}$$

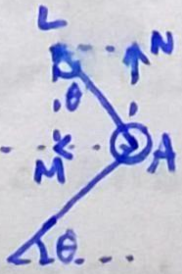
The direction of induced emf is 'into,' given by Fleming's right-hand rule or flat hand rule.

If the conductor A moves at an angle θ with the direction of flux, then the induced emf is $e = Blv \sin\theta$ volts.

Generation of an alternating emf :



(a)



(b)

Coil AB is shown after it has rotated through an angle θ from the horizontal position, i.e. the position of zero emf. Suppose the peripheral velocity of each side of the loop to be v m/s; then this v can be represented by the length of a line AL drawn ⊥