Quiz # 9

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III

Drive relation between electric field and induced magnetic field.

As we know that electric field is given as;

$$\varepsilon = \frac{W}{q_o}$$

$$W = \varepsilon q_o \quad \dots \dots (I)$$

As we know work done is given

$$W = \oint \vec{F} \cdot \vec{ds} = \oint F ds \cos\theta$$

$$W = \oint F d \cos(0°) = F \oint ds$$

$$W = F (2\pi r) \qquad \therefore \oint ds \text{ for completes sphere} = 2\pi r$$

$$W = q E (2\pi r) \quad \dots (II) \quad \therefore F = q E \text{ in case of electric field}$$

Compairing equation I and II

$$\varepsilon q_o = q \cdot E (2\pi r)$$

$$\varepsilon = E (2\pi r)$$

$$\varepsilon = \oint \vec{E} \cdot \vec{ds} \quad \dots \dots (III)$$

Accroding to Faraday Law

$$\varepsilon = -\frac{d\phi_B}{dt} \quad \dots \dots (IV)$$

Compare III and (IV)

$$\oint E \cdot ds = -\frac{d\phi_B}{dt} \quad \text{this is relation given}$$

II

Magnetic field is decreasing
What is induced electric
field.

Accroding to the given formula
electric induced field,

$$\oint E.ds = -\frac{d\phi_B}{dt}$$

if magnetic field is decreasing
then electric field also
decreasing but direction is
opposite of magnetic field.

(I)

What is induced electric field
write diffrence between induced
electric field and static electric
field.

Induced electric field mean that
there is a relation between
electric and magnetic field
which tell the effect of how changing
magnetic field change electric
field and vice versa.

- Induced electric field is due to moving electric charges.
- Static electric field is due to rest of charges.