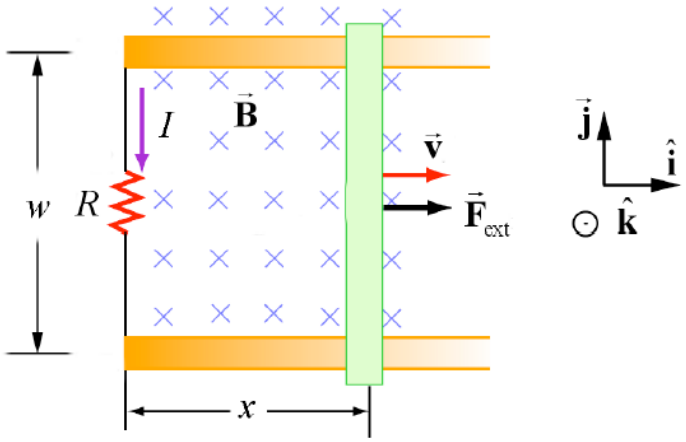
Fields and Waves
Tutorial-10 5thApril, 2016

Ques1: Consider the loop given below. If $\vec{B} = 0.5\hat{a}_z \frac{Wb}{m^2}, R = 20\Omega, w = 10cm$ and the rod is moving with a constant velocity of $8\hat{a}_z$



Ques2: What values of A and B are required if the two fields $\vec{E} = 120\Pi \cos(10^6\Pi t - \beta x)\, \hat{a}_y$ V/m and $\vec{H} = A\cos(10^6\Pi t - \beta x)\, \hat{a}_z$ A/m satisfy Maxwell's equations in linear, isotropic homogeneous medium where $\varepsilon_r = \mu_r = 4$ and $\alpha = 0$

Ques3: For a uniform plane wave in fresh lake water $\sigma = 10^{-3}\frac{mhos}{m}, \varepsilon_r = 80, \mu = \mu_o$. Calculate $\alpha, \beta, \eta \; and \; \lambda$ for two frequencies 100MHz and 10 KHz.

Home Assignment to be submitted and discussed during tutorial session.

Ques1: In a material for which $\sigma = 5\frac{mhos}{m}$ and, $\varepsilon_r = 1$, the electric field intensity is $\vec{E} = 250\sin(10^{10}t)$ V/m. Calculate the conduction current and conduction current densities and the frequency at which they have equal magnitude.

Ques2: A plane wave propagating through a medium with $\varepsilon_r = 8, \mu_r = 2$ has $\vec{E} = e^{-z/3}\sin(10^8 t - \beta z)\, \hat{a}_x$ V/m. Determine

a) β
b) Wave velocity
c) Loss tangent
d) $\vec{H}$
e) Intrinsic Impedance