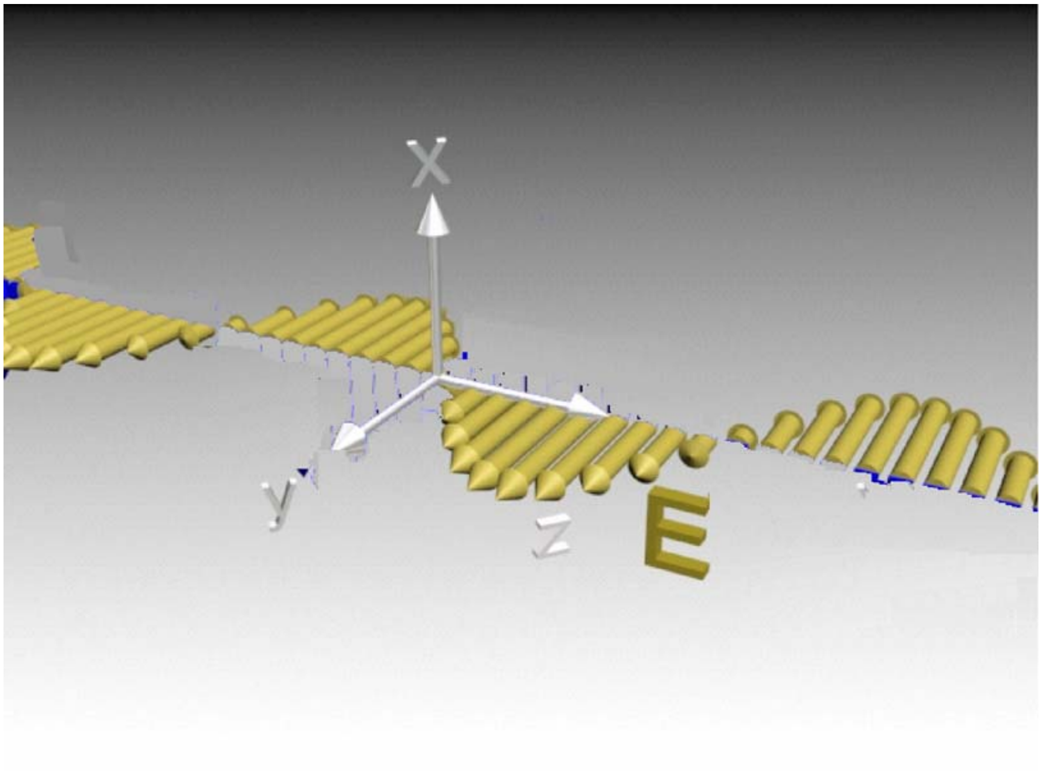
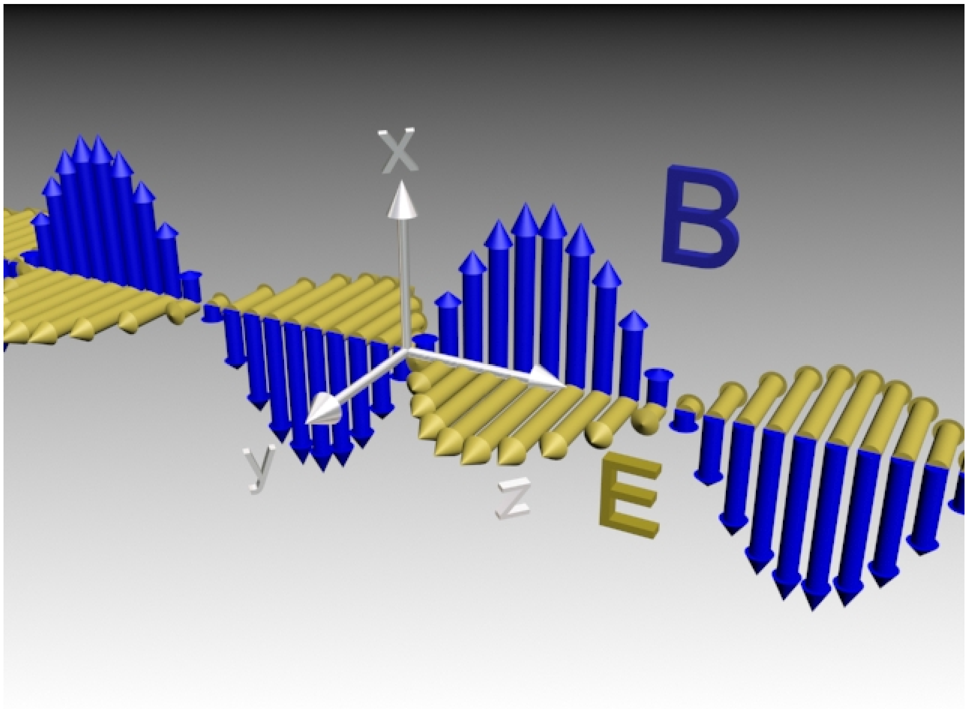


The E field of a plane EM wave is

$$\mathbf{E}(z,t) = \hat{\mathbf{j}} E_0 \sin(kz + \omega t)$$

The magnetic field of this wave is given by

1. $\mathbf{B}(z,t) = \hat{\mathbf{i}} B_0 \sin(kz + \omega t)$
2. $\mathbf{B}(z,t) = -\hat{\mathbf{i}} B_0 \sin(kz + \omega t)$
3. $\mathbf{B}(z,t) = \hat{\mathbf{k}} B_0 \sin(kz + \omega t)$
4. $\mathbf{B}(z,t) = -\hat{\mathbf{k}} B_0 \sin(kz + \omega t)$
5. **Don't Have A Clue**

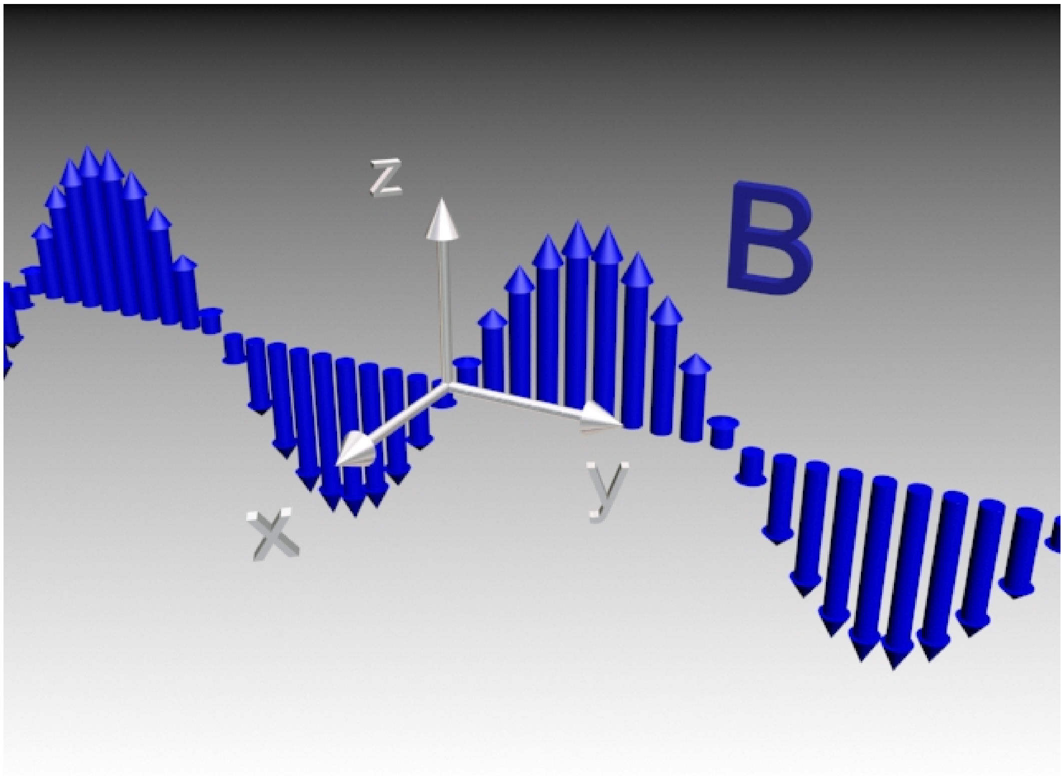


Answer: 1. $\mathbf{B}(z,t) = \hat{\mathbf{i}} B_0 \sin(kz + \omega t)$

From the argument of the sin ($kz + \omega t$), we know the wave propagates in the –z direction.

So we have $\hat{\mathbf{E}} \times \hat{\mathbf{B}} = \hat{\mathbf{j}} \times ? = -\hat{\mathbf{k}}$

$$\Rightarrow \hat{\mathbf{B}} = \hat{\mathbf{i}}$$

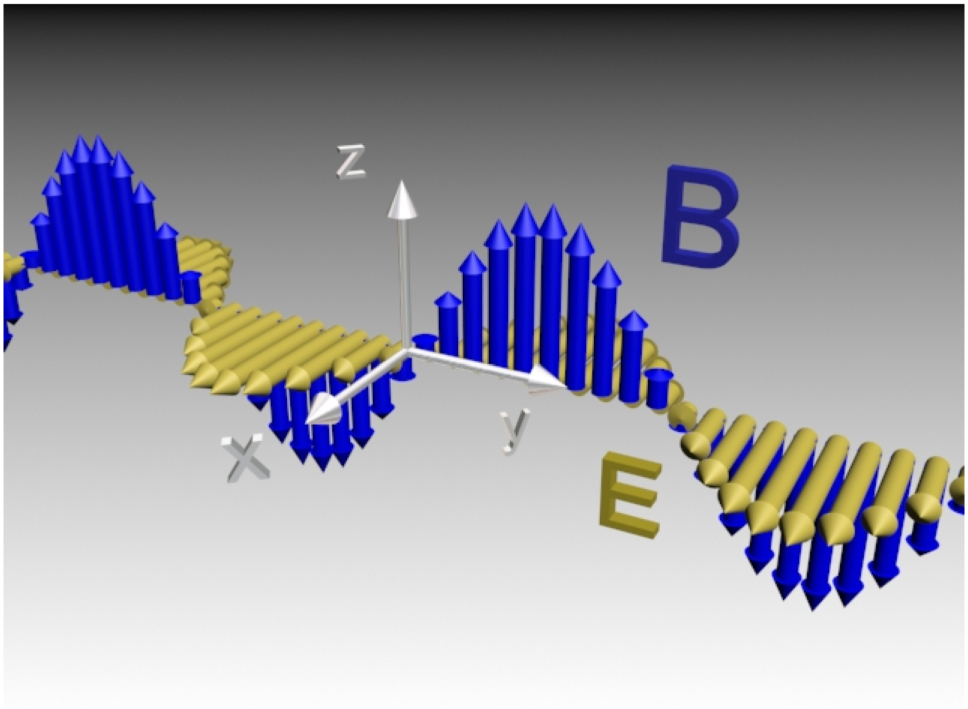


The B field of a plane EM wave is

$$\mathbf{B}(y,t) = \hat{\mathbf{k}} B_0 \sin(ky - \omega t)$$

The electric field of this wave is given by

1. $\mathbf{E}(y,t) = \hat{\mathbf{j}} E_0 \sin(ky - \omega t)$
2. $\mathbf{E}(y,t) = -\hat{\mathbf{j}} E_0 \sin(ky - \omega t)$
3. $\mathbf{E}(y,t) = \hat{\mathbf{i}} E_0 \sin(ky - \omega t)$
4. $\mathbf{E}(y,t) = -\hat{\mathbf{i}} E_0 \sin(ky - \omega t)$
5. **Don't Have A Clue**



Answer: 4. $\mathbf{E}(y,t) = -\hat{\mathbf{i}}\sin(ky - \omega t)$

From the argument of the sin $(ky - \omega t)$**, we know the wave propagates in the +y direction.**

$$\text{So we have } \hat{\mathbf{E}} \times \hat{\mathbf{B}} = ? \times \hat{\mathbf{k}} = \hat{\mathbf{j}}$$

$$\Rightarrow \hat{\mathbf{E}} = -\hat{\mathbf{i}}$$