552.

Problem 41.7 (RHK)

A certain plane electromagnetic wave has a maximum electric field of $321\ \mu\text{V m}^{-1}$. *We have to find the maximum magnetic field.*

Solution:

For a plane electromagnetic wave the electric field, E, and the magnetic field, B, are related as

$E = cB.$

It is given that the plane electromagnetic wave has a maximum electric field of $321\ \mu\text{V m}^{-1}$. Therefore, the maximum magnetic field associated with the wave will be

$$B_{\max} = \frac{E_{\max}}{c} = \frac{321\times10^{-6}}{3\times10^{8}}\ \text{T} = 1.07\times10^{-12}\ \text{T} = 1.07\ \text{pT}.$$