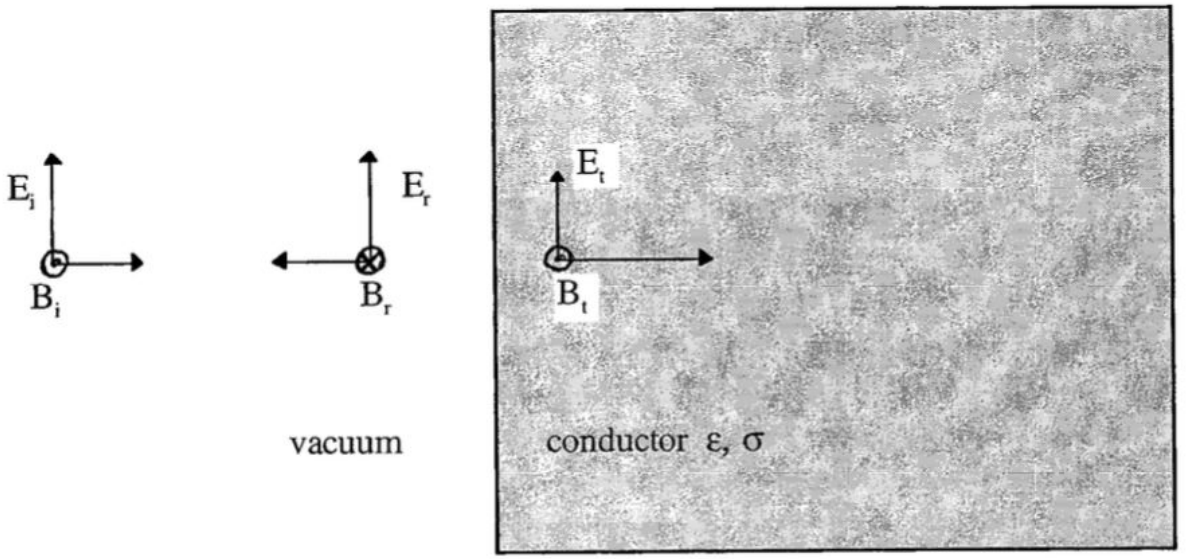
(d) (25 points) Consider a monochromatic plane wave in free space normally incident on a nonmagnetic, homogeneous, linear, ohmic conductor (not necessarily a good conductor).



Show that the reflected electric field amplitude is related to the incident electric field amplitude by a relation of the form

$$E_r = \left(\frac{1-\beta}{1+\beta}\right) E_i,$$

derive the value of β and show that for a perfect conductor the wave is totally reflected with a π phase shift.