

1. Jackson 9.3
2. Jackson 14.9 [only (a) and (c) and consider only the non-relativistic limit]
3. Consider an infinite plane of charge per unit area σ located at $z = 0$. The sheet oscillates along the x direction with a displacement $\Delta x = d e^{-i\omega t}$.
 - (a) Calculate the electric field from the charged sheet when $d = 0$.
 - (b) Sketch the electric field when $d \neq 0$. Indicate the direction of the magnetic field. What is the direction of the Poynting vector? How do E and B fall off with distance $|z|$ from the charged sheet?
 - (c) Starting from Maxwell's equations, derive a differential equation for the time varying electric and/or magnetic field.
 - (d) Solve the differential equation for the time varying electric and magnetic fields and the Poynting flux.
 - (e) The sheet now oscillates in the z direction rather than the x direction. Indicate how the previous results would change.