

Consider a parallel plate capacitor that being charges with a current I . (a) What is the displacement current as a function of time (b) Show the same thing by computing $d\phi_e/dt$

Consider a cell tower which is 20m above the ground. If you are 40 m away, what is the signal intensity if the tower transmits at 100 W. How would it be different if you climb vertically up 20m from your spot.

Consider the wave equation $\frac{\partial^2 f}{\partial x^2} = \frac{1}{v^2} \frac{\partial^2 f}{\partial t^2}$. Show that $\cos(x) \cos(vt)$ satisfies the wave equation. Does any form of $f(x)f(vt)$ satisfy the wave equation? Why or why not?

Consider 0.001 kg particles falling toward a mass M that has a cross sectional area of 10^{-4}m^2 . (a) calculate the gravitational force at a distance r (b) if the mass has total power output in radiation of L , what is the radiation pressure at a distance r ? (c) what is the radiation force on the particles (d) for what value of L does the radiation force equal the gravitational attraction. Show that this value of L is independent of r .