Physics 200

Chapter 32: Inductance (Lecture Examples)

Ex:1 Calculate the inductance per unit length of a solenoid.

Ex:2 Calculate the inductance of a toroid whose cross section is a rectangle. The inner radius is a, the outer radius is b and the height is h.

Ex:3 Calculate the inductance per unit length of a coaxial cable.

Ex:4 In a charging LR circuit how many time constants must elapse for the current to reach 90 % of its maximum value?

Ex:5 A resistor, R, and an inductor, L, have been connected in series to a battery, V, for a long time. Calculate current and voltage at the resistor as a function of time after the battery has been removed from the circuit.

Ex:6 Calculate the energy stored in the B field of a "N" turn solenoid that has length, x, with a current, I. The radius of the solenoid is "a".

Ex:7 Calculate the energy density for the above solenoid.

Ex:8 Calculate the energy stored in the inductor of a discharging RL circuit as a function of time after the battery has been disconnected. The inductor has a maximum voltage, Vmax.