

Physics 101: How the “world” works Fall 2008

Homework 6

Due in your studio on Tuesday, Nov. 4, Wednesday, Nov. 5 or
Thursday, Nov. 6

Chapter 11 Exercises

- (1) 7
- (2) 18
- (3) 36
- (4) 42

Chapter 11 Problems

- (4) 1
- (5) 8

Other Problems

(6) A defibrillator consists of a $15 \mu\text{F}$ capacitor that is charged to 9 kV. If the capacitor is discharged in 2 ms, how much charge passes through the body tissues? If the energy stored in a capacitor is given by $\frac{1}{2}CV^2$, where C is the capacitance and V is the voltage, what is the power delivered to the tissue?

(7) A magnetic field directed along the long axis a 50-turn coil of wire with radius 5.0 cm increases from 0 to 1.8 T in 3.6 sec. If the resistance of the coil is 2.8 Ohms, what is the magnitude of the induced current in the coil?

Extra Credit A proton moves in a helical path at speed $v = 4 \times 10^7$ m/s high in the atmosphere, where the Earth’s own magnetic field has magnitude $B = 1 \times 10^{-6}$ T. The proton’s velocity makes an angle of 25 degrees with respect to the magnetic field. (a) Find the radius of the helix. (b) Find the pitch of the helix—the distance between adjacent “coils”.