5 Chapter 14: Inductance

1. What is (a) the rate at which the current though a 0.50-H coil is changing if an emf of 0.150 V is induced across the coil? a) $\mathcal{E} = -L\frac{\Delta I}{\Delta t}$

$|\mathcal{E}| = L\frac{\Delta I}{\Delta t}$, $\mathcal{E} = .150V$, $L = .5H$

$\frac{\mathcal{E}}{L} = \frac{\Delta I}{\Delta t}$

$\frac{.15V}{.5H} = .3\ A/s$

2. When a camera uses a flash, a fully charged capacitor discharges through an inductor. In what time must the 0.100-A current through a 2.00-mH inductor be switched on or off to induce a 500-V emf?

$\mathcal{E} = L\left(\frac{\Delta I}{\Delta t}\right)$ $I = .100A$, $L = 2mH = 2\cdot10^{-3}H$, $\mathcal{E} = 500V$

$500V = (2\cdot10^{-3}H)(.100A)/\Delta t$

$\Delta t = 2\cdot10^{-3}H(.100A)/500V$

$4\cdot10^{-7}HA/V$

$\Delta t = 4\cdot10^{-7}\ sec$