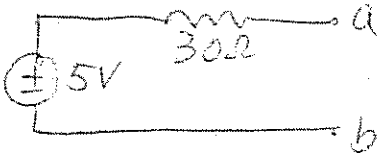
Final 2006 Answer Key

Q1. Part A $q_3 = +0.68\ nC$ Part B $v = \frac{Q}{4\pi\epsilon_0 r^2 B}$

Q2. $V_0 = 2V$, $P_{0.5A} = 6W$ Part A



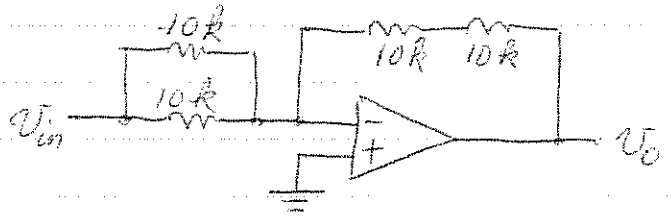
$P_{max} = 0.208\ W$ Part B

Q3. Part A $I_1 = -8\ mA$
$I_2 = 36\ mA$
Part B $V_0 = +2.4\ V$

Q4. $i_L(0^-) = -5A$
$i_L(0^+) = -5A$
$v_x(0^-) = 0\ V$
$v_L(0^+) = 60\ V$
$i_L(\infty) = -2A$

$\tau = 200\ \mu s$
$i_L(t) = -2 - 3e^{-5000t}\ A$
$v_L(t) = 60e^{-5000t}\ V$

Q5. Part A $R_{in} = 5\ k\Omega$ Part B $i_o/i_s = -2\ A/A$
$v_o = -10\ V$



Q6. $I = 200 \angle -37^\circ\ A_{RMS}$
$Z_{LINE} = 0.05 + j0.075\ \Omega$
$V_g = 257 \angle 1.34^\circ\ V_{RMS}$