Name: _____

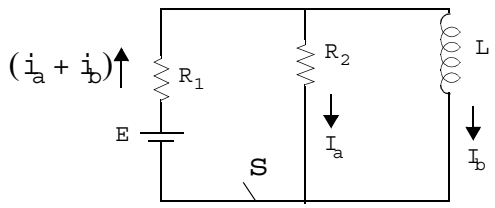
Physics 151

Prof. Thomson's Section

Solutions to Quiz on Ch 30
April 8, 2005

Consider the circuit below.

$E = 10V$
$R_1 = 2\Omega$
$R_2 = 4\Omega$
$L = 6H$



(a) Just after switch closed:

$$I_a = \frac{E}{(R_1 + R_2)} = \frac{10}{6} = 1.67A$$

$I_a = 0A$ since inductor opposes changes in current and current can't change from 0 instantaneously.

(b) $t = t_1 \quad i = 2.433A \quad \frac{di}{dt} = +0.570A/s$

$$U = \frac{1}{2}Li^2 = \frac{1}{2} \times 6 \times (2.433)^2 = 17.8 \text{ joules}$$

(c) Long time after, inductor gives no resistance. - current flows thru inductor $\frac{Ldi}{dt} = 0$

$i_a = 0$

$i_b = \frac{E}{R_1} = \underline{\underline{5A}}$

(d) $I_a = I_b = \underline{\underline{5A}}$ just after S re-opened.