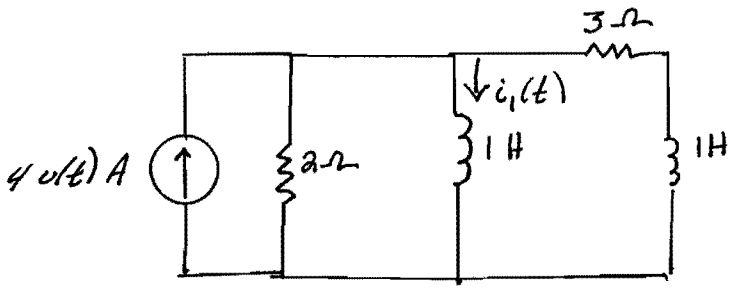
EE 221 Practice Quiz Name:

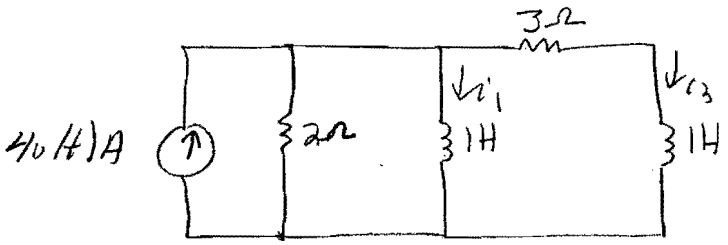
For the circuit below find $i_1(t)$ for $t \geq 0$ using the Laplace transform.

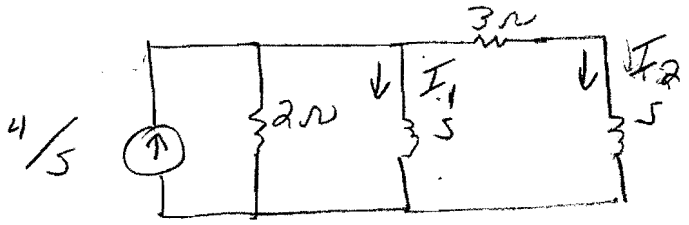


No aid given, received, or observed: _____

Practice Quiz 5 Solution

$i_1 = ?$ $\quad t > 0$





$$I_1 = \frac{4}{s}\left(\frac{1}{\frac{1}{2} + \frac{1}{s} + \frac{1}{s+3}}\right)$$

$$= \frac{4}{s}\left(\frac{1}{\frac{s}{2} + 1 + \frac{s}{s+3}}\right)$$

$$= \frac{4}{s}\left(\frac{2(s+3)}{s^2+3s+6+2s}\right)$$

$$= \frac{4}{s}\left(\frac{6+2s}{s^2+7s+6}\right)$$

$$= \frac{24+8s}{s(s+1)(s+6)}$$

$$= \frac{K_1}{s} + \frac{K_2}{(s+1)} + \frac{K_3}{(s+6)}$$

$$K_1 = \left.\frac{24+8s}{(s+1)(s+6)}\right|_{s=0} = 4$$

$$K_2 = \left.\frac{24+8s}{(s)(s+6)}\right|_{s=-1} = -3.2$$

$$K_3 = \left.\frac{24+8s}{(s)(s+1)}\right|_{s=-6} = -0.8$$

$$i_1(t) = 4u(t) - 3.2e^{-t}u(t) - 0.8e^{-6t}u(t)\ A$$