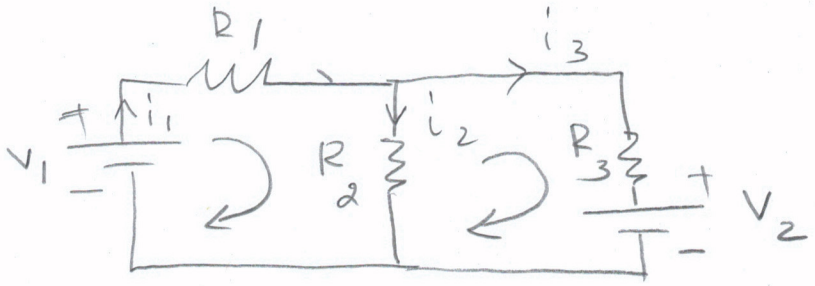
Answers Exam 2 2019

1.

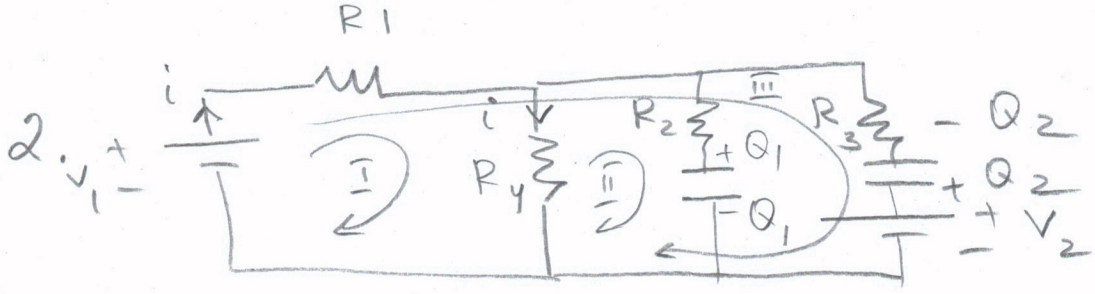


$$i_1 = i_2 + i_3$$

$$-V_1 + i_1 R_1 + i_2 R_2 = 0$$

$$i_3 R_3 + V_2 - i_2 R_2 = 0$$

2.



$$i = \frac{V_1}{R_1 + R_4}$$

$$Q_1 = C_1 R_4 i = C_1 V_1 \frac{R_4}{R_1 + R_4}$$

$$Q_2 = (V_2 - V_1 + i R_1) C_2$$

$$i = 2\,A,\ Q_1 = 18\,C,\ Q_2 = -16\,C$$

3. $$i = \frac{4\pi b^2 V}{\rho_0 (b-a)}\ ;\ Q_{encl} = \varepsilon_0 \rho_0 \frac{r^2}{b^2} i$$

4. $$V(2B) - V(0) = -\left[\frac{Q}{4\pi\varepsilon_0 D^3}\frac{D^2}{2} - \frac{Q}{4\pi\varepsilon_0}\left(\frac{1}{A} - \frac{1}{D}\right) - \frac{Q}{4\pi\varepsilon_0}\left(\frac{1}{2B} - \frac{1}{B}\right)\right]$$