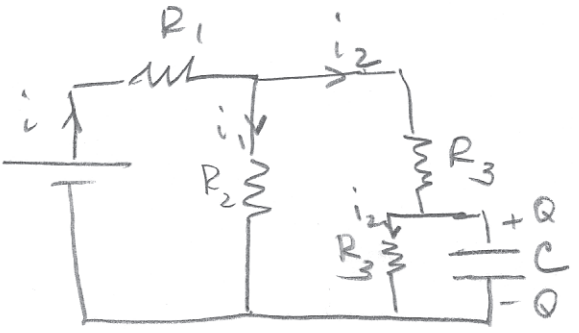
Answers Test 2 2013

1. a) $i = i_1 + i_2$

$-V + iR_1 + i_1R_2 = 0$

$-V + iR_1 + i_2R_3 + i_2R_3 = 0$

$\frac{Q}{C} - i_2R_3 = 0$



b) $Q = C\frac{V}{2}$

2. 1) $r < A \quad \vec{E} = \frac{1}{2\pi\varepsilon_0 L}\frac{Q_2}{r}$ rad. out

2) $A < r < B \quad \vec{E} = 0$

3) $r > B \quad \vec{E} = \frac{1}{2\pi\varepsilon_0 L}\frac{Q_1+Q_2}{r}$ rad. out

$-[V(5B) - V(\frac{A}{2})] = \frac{Q_2}{2\pi\varepsilon_0 L}\ln 2 + \frac{Q_1+Q_2}{2\pi\varepsilon_0 L}\ln 5$

3. a) $r < A \quad \vec{E} = 0$

$A < r < B \quad \vec{E} = \frac{1}{3\varepsilon_0 r^2}\rho_0(r^3 - A^3)$ rad. out

$r > B \quad \vec{E} = \frac{\rho_0}{3\varepsilon_0}\frac{B^3 - A^3}{r^2}$ rad. out

b) $r < A \; \vec{E} = 0 \cdot A < r < B \; \vec{E} = \frac{\rho_0}{5\varepsilon_0 B^2 r^2}(r^5 - A^5)$ rad. out

$r > B \quad \vec{E} = \frac{\rho_0}{5\varepsilon_0 B^2 r^2}(B^5 - A^5)$ rad. out

4. a) $\vec{E} = \rho\frac{i}{2\pi r W}$ rad. out

b) $R = \frac{\rho}{2\pi W}\ln\frac{b}{a}$

c) $R = \frac{\rho_0}{2\pi b W}(b - a)$