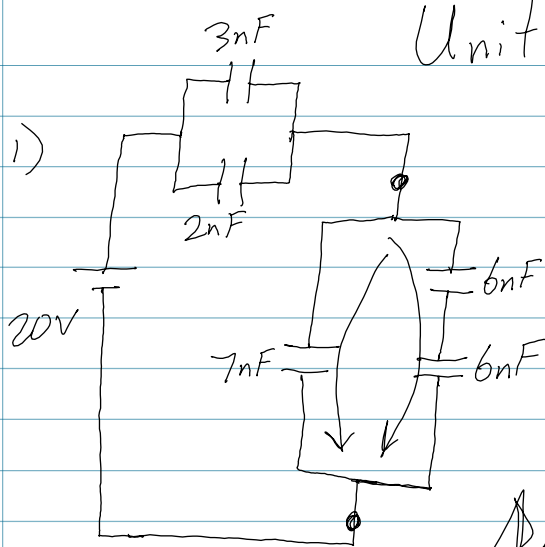
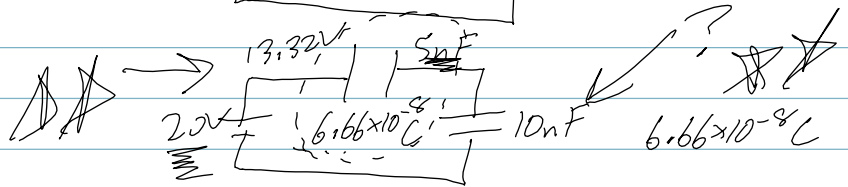
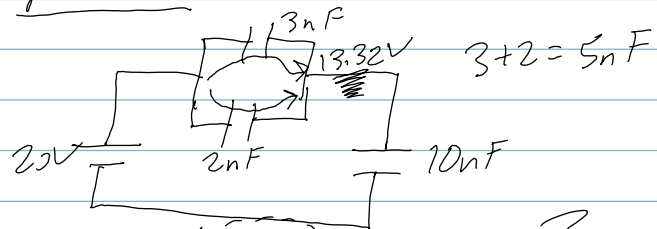


Unit 8



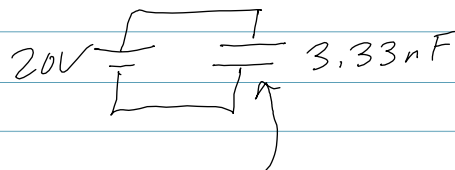
$$\frac{1}{C_s} = \frac{1}{C_1} + \frac{1}{C_2} = \frac{1}{6} + \frac{1}{6} = \frac{2}{6} \quad \frac{6}{2} \Rightarrow 3nF$$

$$C_p = C_1 + C_2 = 7 + 3 = 10nF$$



① $C_{eq} = ? \Rightarrow \boxed{3.33nF}$

$$\frac{1}{5} + \frac{1}{10} = \frac{3}{10} \quad \frac{10}{3} \Rightarrow 3.33nF$$



② $Q_2 = ? \quad C = \frac{Q}{V} \quad 3.33 \times 10^{-9} = \frac{Q}{20} \quad Q = 6.66 \times 10^{-8} C$

$$C = \frac{Q}{V} \quad 5 \times 10^{-9} = \frac{6.66 \times 10^{-8}}{V} \quad V = 13.32V$$

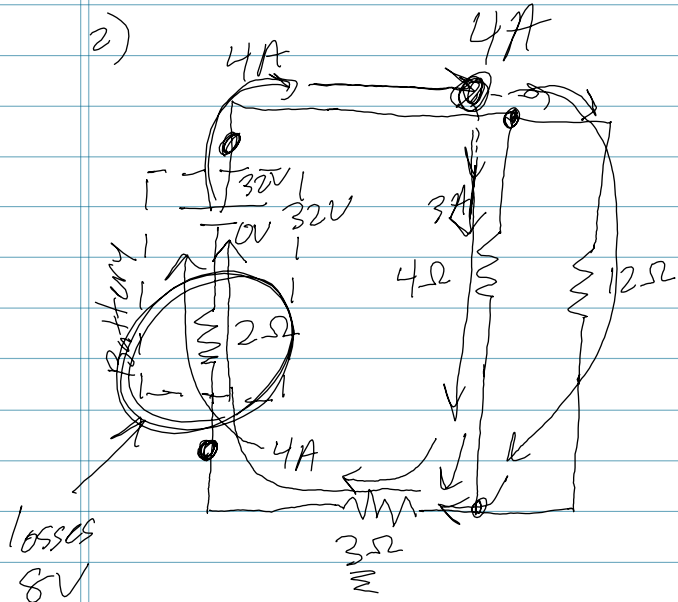
$$C = \frac{Q}{V} \quad 2 \times 10^{-9} = \frac{Q}{13.32V} \quad \boxed{Q = 2.66 \times 10^{-8} C}$$

③ $Q_7 = ? \quad 20 - 13.32 = 6.68V \quad 7 \times 10^{-9} = \frac{Q}{6.68}$

$$\boxed{Q = 4.68 \times 10^{-8} C}$$

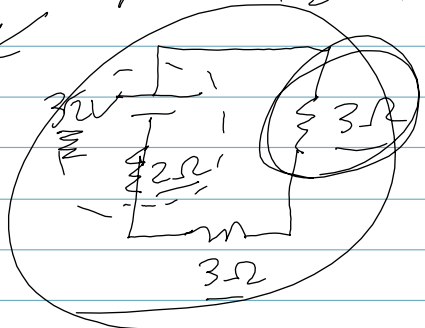
④ $\boxed{V_2 = 13.32V}$

⑤ $U = \frac{1}{2} C V^2 = \frac{1}{2} (7 \times 10^{-9}) (6.68)^2 = \boxed{1.56 \times 10^{-7} J}$



$I_3 = ?$

$$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{4} + \frac{1}{12} = \frac{4}{12} \quad \frac{12}{4} = 3\Omega$$



$$R_s = R_1 + R_2 + R_3 = 3 + 3 + 2 = 8\Omega$$

$$I = \frac{V}{R} = \frac{32}{8} = \boxed{4A}$$

$$V_t = ? \quad I = \frac{V}{R} \quad 4 = \frac{V}{2} \quad V = 8V$$

$$32 - 8 = \boxed{24V}$$

$$I_4 = ? \quad 4 = \frac{V}{3} \quad V = 12V$$

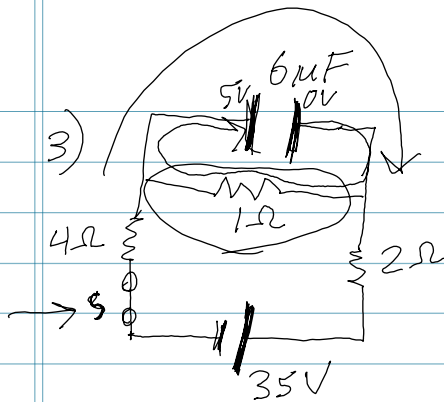
$$I = \frac{12}{4} = \boxed{3A}$$

$$P_{12} = ? \quad P = I^2 R \quad 4 - 3 = 1A$$

$$P = I V$$

$$P = 1^2 (12) = 12W$$

$$P = 1 (12) = 12W$$



$$I_{\text{Batt}} = ? \quad R_s = R_1 + R_2 + R_3 = 4 + 1 + 2 = \underline{7\Omega} = R_{\text{tot}}$$

$$I = \frac{V}{R} = \frac{35}{7} = \boxed{5A}$$

$$Q_{6\mu F} = ? \quad I = \frac{V}{R} \quad S = \frac{V}{I} \quad V = 5V$$

$$C = \frac{Q}{V} \quad 6 \times 10^{-6} = \frac{Q}{5} \quad \boxed{Q = 3 \times 10^{-5} C}$$

What happens when the switch "S" is opened?

So, the cap. provides voltage that cause current to flow through the 1Ω res.
Over time the voltage on cap. dec. so I through 1Ω res. is also dec.