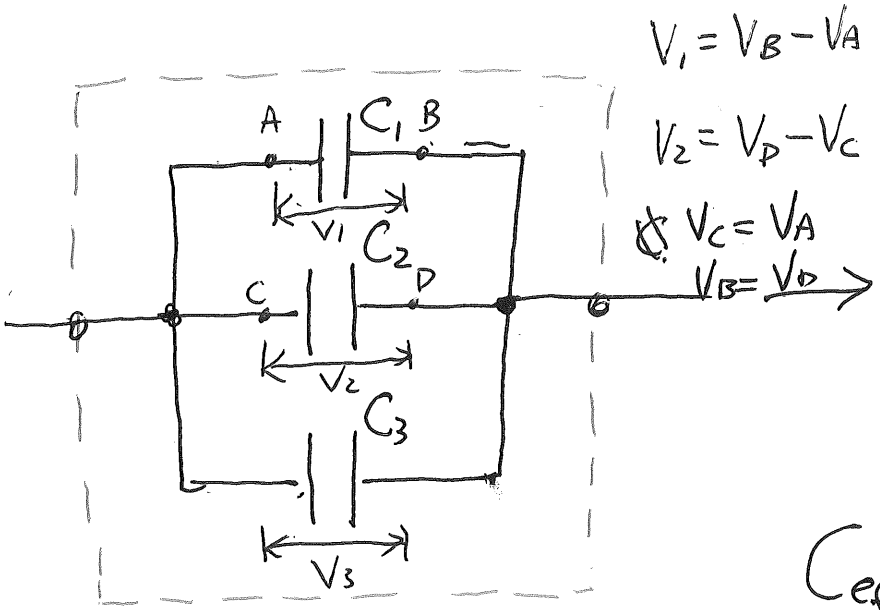
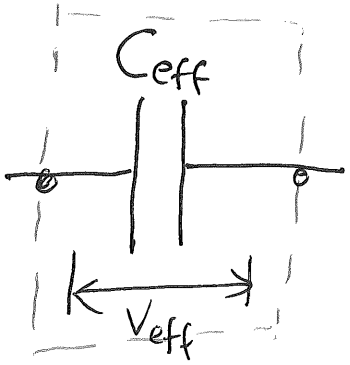
Capacitors in parallel.





$$C_{eff} = C_1 + C_2 + C_3.$$

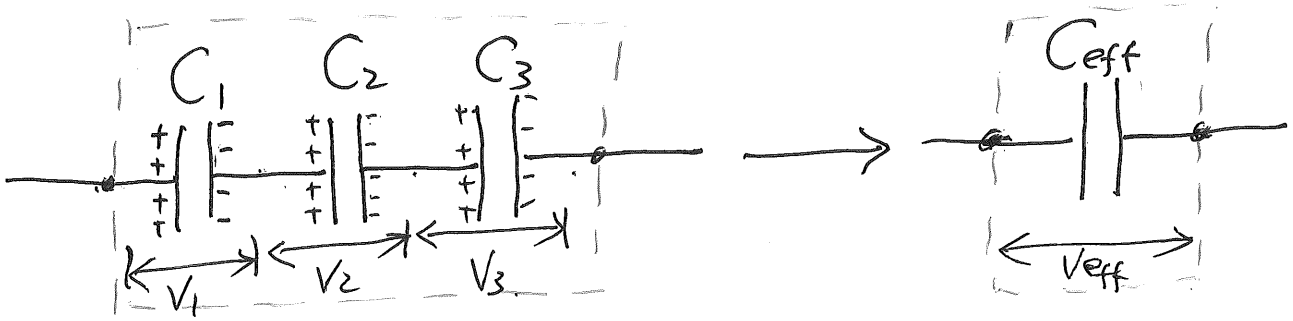
$$V_1 = V_2 = V_3 = V_{eff}$$

$$C = \frac{Q}{V} \Rightarrow Q = CV.$$

$$Q_1 \neq Q_2 \neq Q_3 \neq Q_{eff} \quad \text{if } C_1 \neq C_2 \neq C_3 \neq C_{eff}.$$

$$Q_{eff} = Q_1 + Q_2 + Q_3.$$

Capacitors in series.



$$\frac{1}{C_{eff}} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}.$$

$$Q_1 = Q_2 = Q_3 = Q_{eff}. \leftarrow$$

$$C = \frac{Q}{V} \Rightarrow V = \frac{Q}{C}.$$

$$V_1 \neq V_2 \neq V_3 \neq V_{eff} \quad \text{if } C_1 \neq C_2 \neq C_3 \neq C_{eff}.$$

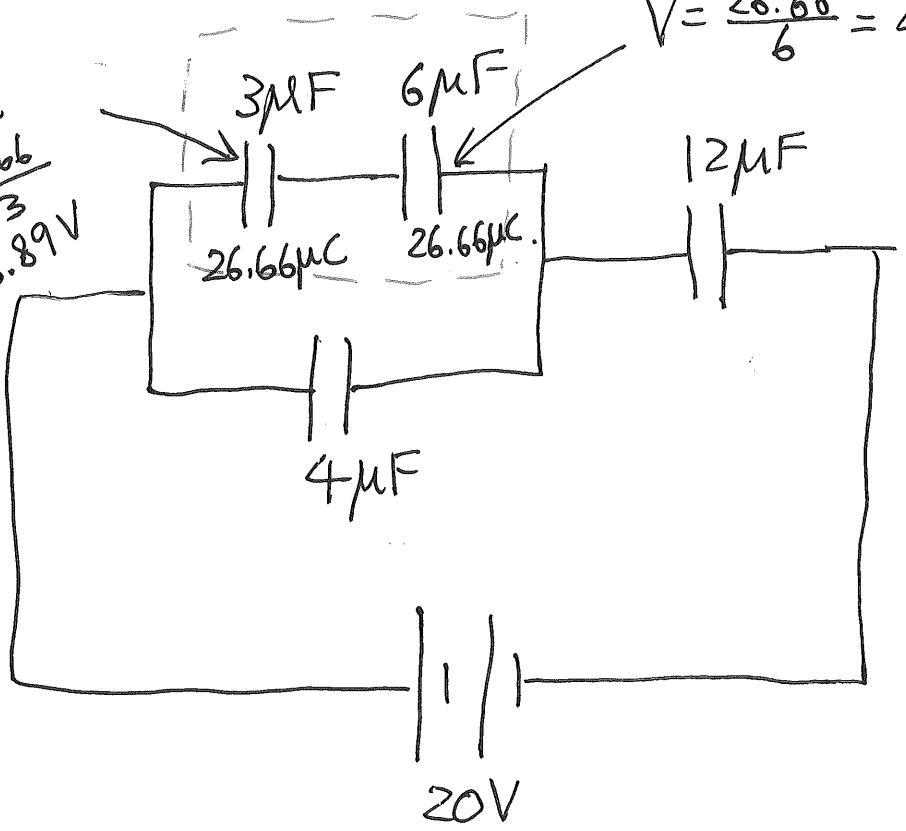
$$V_{eff} = V_1 + V_2 + V_3.$$

$V = \frac{Q}{C}$

$= \frac{26.66}{3}$

$= 8.89\,V$

$V = \frac{26.66}{6} = 4.44\,V$.

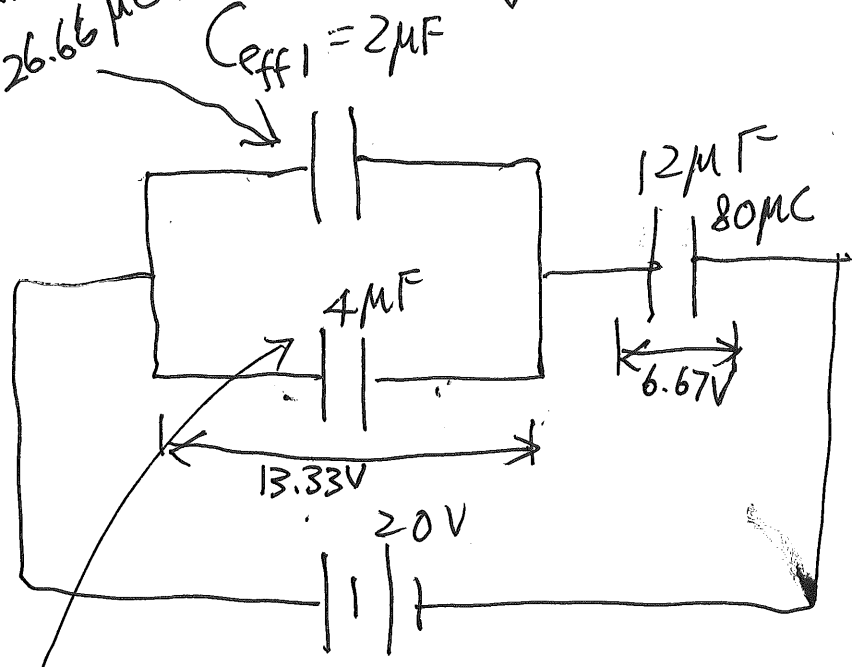


$\frac{1}{C_{eff1}} = \frac{1}{3} + \frac{1}{6} = \frac{1}{2}$

$\Rightarrow C_{eff1} = 2\mu F$

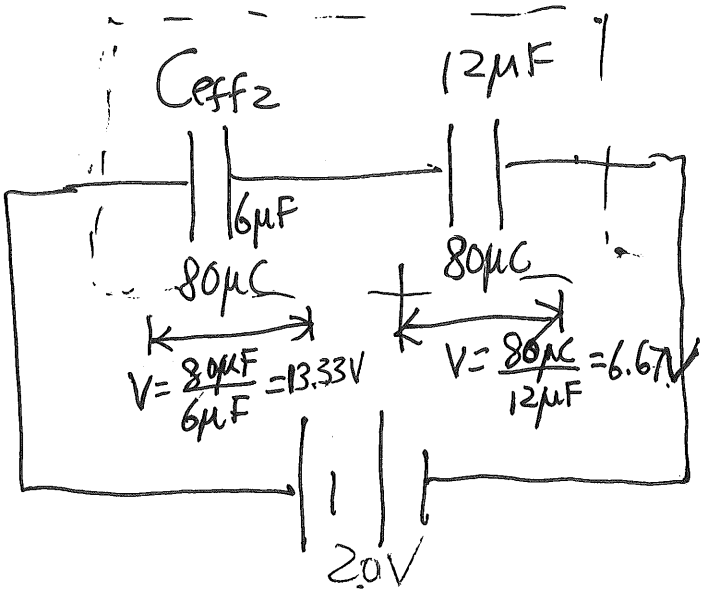
$Q = 2\mu F \times 13.33$

$= 26.66\,\mu C$.



$Q = 4\mu F \times 13.33 = \cancel{3.32}\,53.32\,\mu C$.

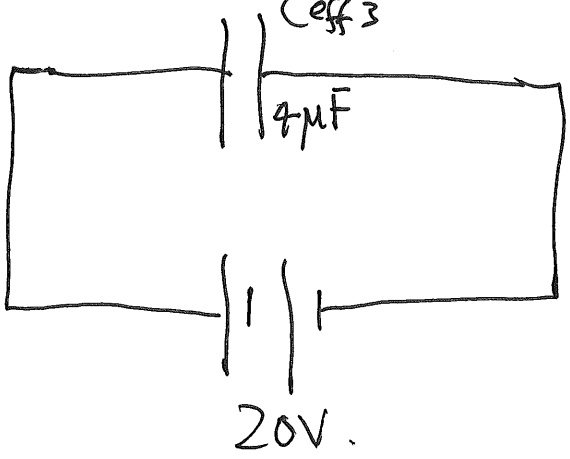
$C_{eff2} = 2 + 4 = 6\mu F$



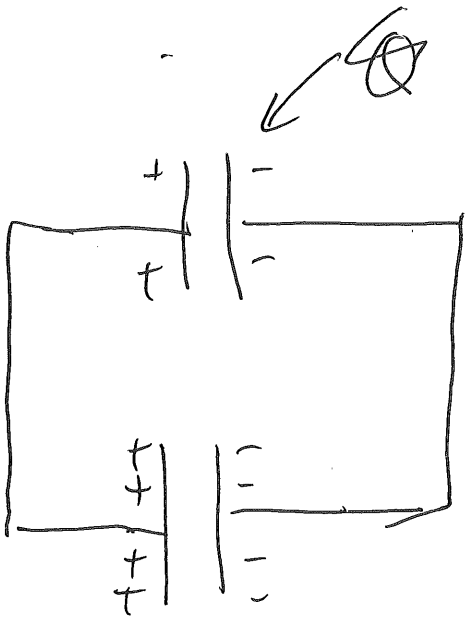
$$\frac{1}{C_{eff3}} = \frac{1}{C_{eff2}} + \frac{1}{12}$$

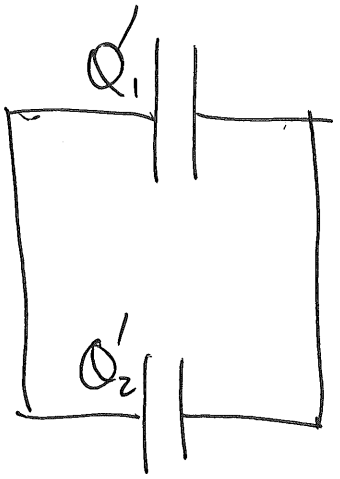
$$= \frac{1}{6} + \frac{1}{12} = \frac{3}{12}$$

$\therefore C_{eff3} = 4\mu F$



$$Q_{eff3} = CV = 4 \times 20 = 80\mu C.$$





$Q_1 = (15\mu F)(27)$

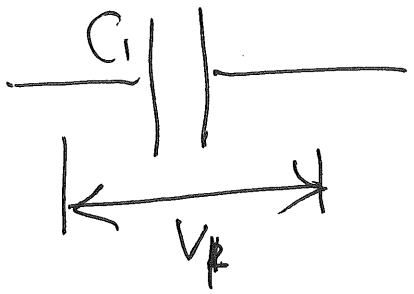
$Q_2 = (12\mu F)(14).$

$$Q_1' + Q_2' = (15\mu F)(27) + (12\mu F)(14). \quad \text{—(1)}$$

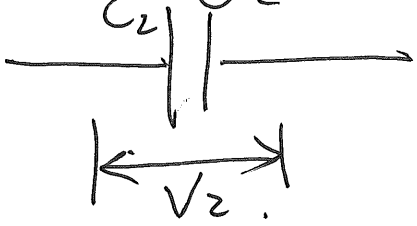
$$C = \frac{Q}{V} \Rightarrow V = \frac{C}{Q}.$$

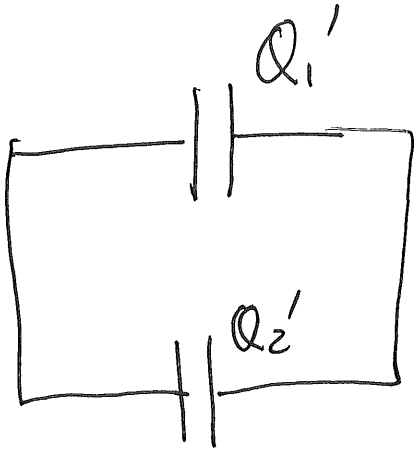
$$\frac{15\mu F}{Q_1'} = \frac{12\mu F}{Q_2'} \quad \text{—(2)}$$

$Q_1 = C_1 V_1$



$Q_2 = C_2 V_2$





$Q_1' + Q_2' = Q_1 + Q_2$ —— (1)

& $V_1 = V_2$

$C = \frac{Q}{V}$

$\Rightarrow \frac{Q_1'}{C_1} = \frac{Q_2'}{C_2}$ —— (2).