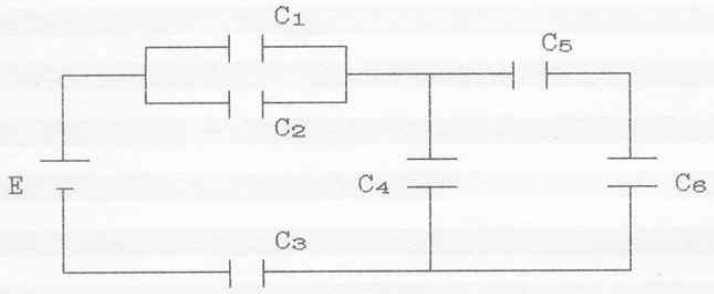
2.1 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



E = 400V ; C_1 = 20μF

C_2 = 40μF ; C_3 = 60μF

C_4 = 9μF ; C_5 = 30μF

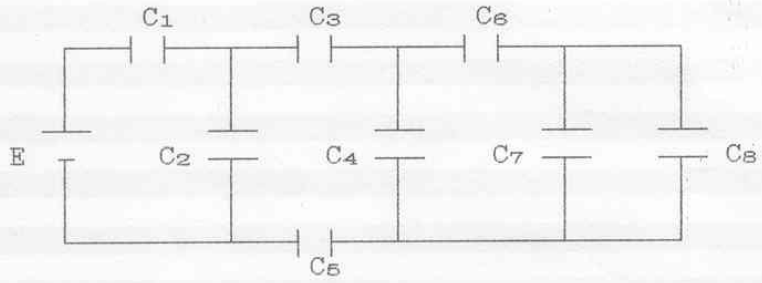
C_6 = 70μF

2.2 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



E = 200V ; C_1 = 60μF

C_2 = 10μF ; C_3 = 90μF

C_4 = 25μF ; C_5 = 30μF

C_6 = 30μF

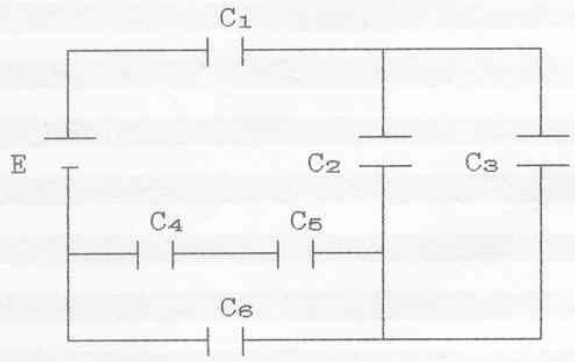
C_7 = C_8 = 120μF

2.3 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



E = 100V ; C_1 = 18μF

C_2 = 10μF ; C_3 = 8μF

C_4 = 20μF ; C_5 = 12μF

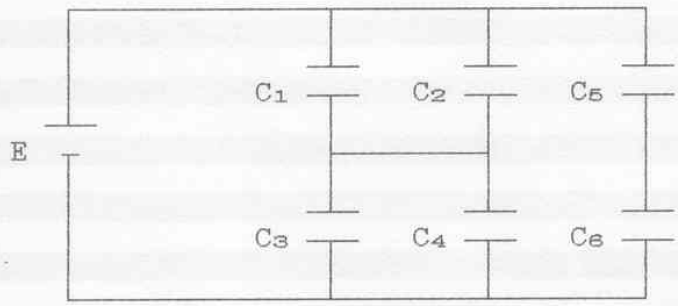
C_6 = 10,5μF

2.4 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



E = 100V ; C_1 = 12μF

C_2 = 6μF ; C_3 = 10μF

C_4 = 8μF ; C_5 = 20μF

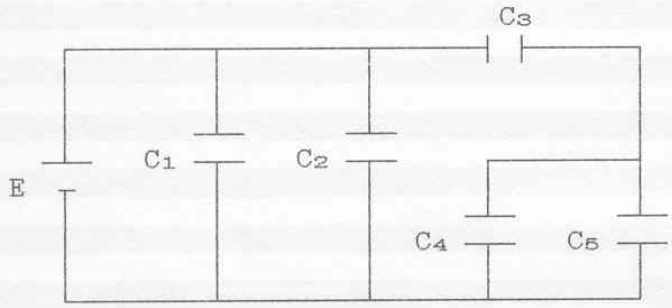
C_6 = 12μF

2.5 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



$E = 10V$; $C_1 = 1,4\mu F$

$C_2 = 2,1\mu F$; $C_3 = 3,5\mu F$

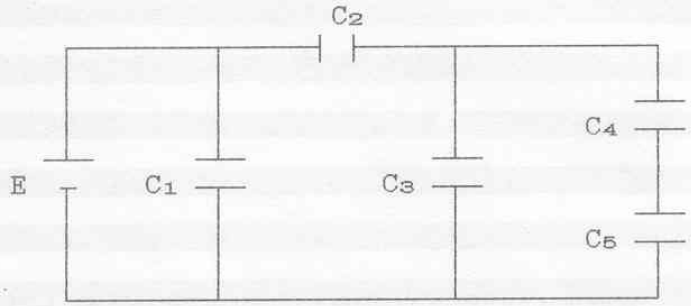
$C_4 = 1,2\mu F$; $C_5 = 1,3\mu F$

2.6 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



$E = 100V$; $C_1 = 4\mu F$

$C_2 = 12\mu F$; $C_3 = 8\mu F$

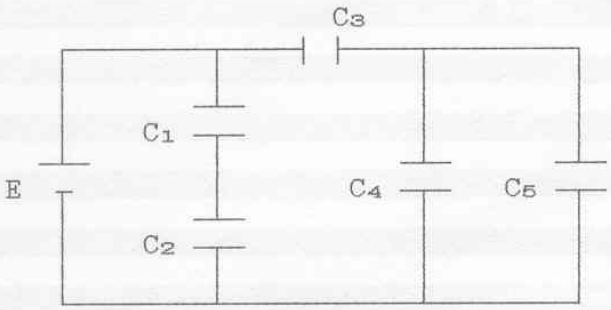
$C_4 = 12\mu F$; $C_5 = 6\mu F$

2.7 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



E = 200V ; C_1 = 8μF

C_2 = 12μF ; C_3 = 8μF

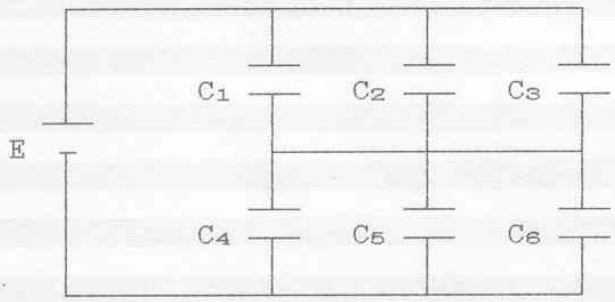
C_4 = 20μF ; C_5 = 5μF

2.8 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



E = 100V ; C_1 = 1,2μF

C_2 = 1,3μF ; C_3 = 2,5μF

C_4 = 1,4μF ; C_5 = 2,1μF

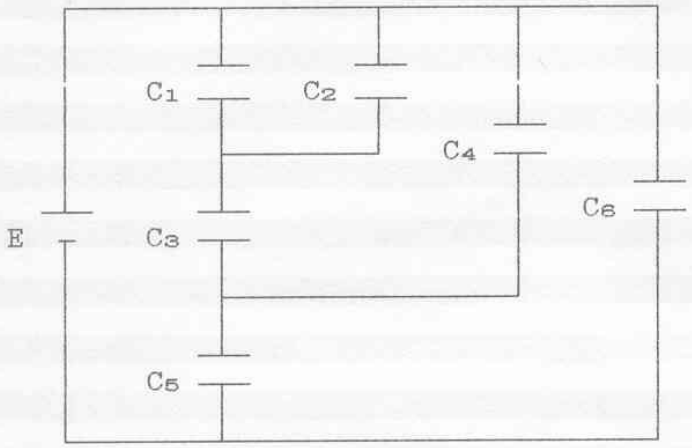
C_6 = 2,5μF

2.9 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



$E = 100V$

$C_1 = C_2 = C_4 = 0,5nF$

$C_3 = C_5 = 1nF$

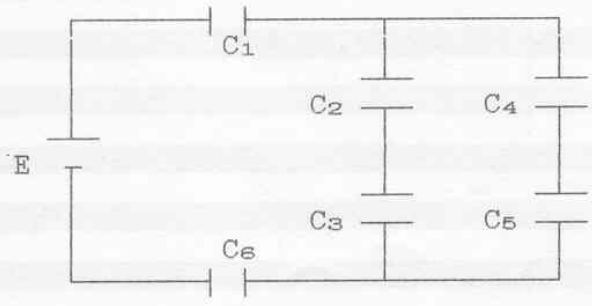
$C_6 = 2nF$

2.10 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



$E = 100V$; $C_1 = 12\mu F$

$C_2 = 180\mu F$; $C_3 = 20\mu F$

$C_4 = C_5 = 60\mu F$

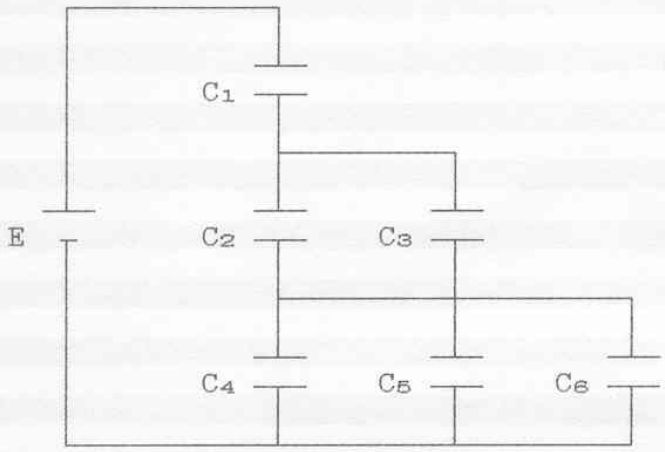
$C_6 = 2,4\mu F$

2.11 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



E = 62,5V ; C_1 = 10nF

C_2 = 15nF ; C_3 = 5nF

C_4 = 3nF ; C_5 = 5nF

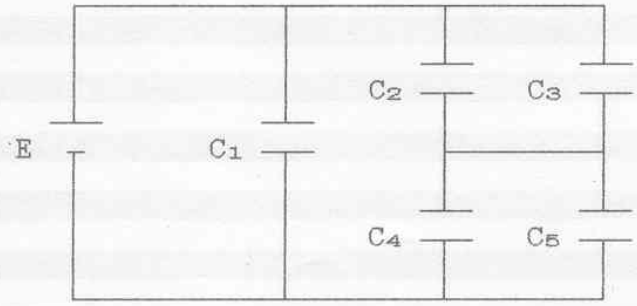
C_6 = 2nF

2.12 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



E = 100V ; C_1 = 1,75μF

C_2 = 1,2μF ; C_3 = 1,3μF

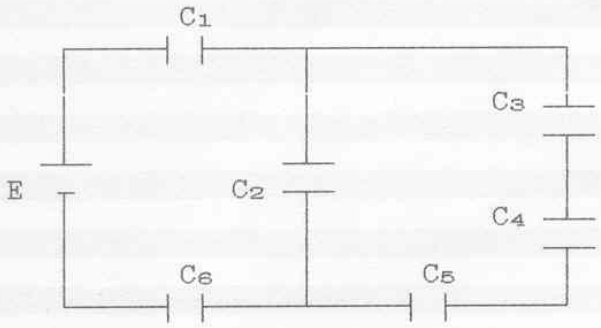
C_4 = 1,4μF ; C_5 = 2,1μF

2.13 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



$E = 10V$; $C_1 = 30\mu F$

$C_2 = 1{,}85\mu F$; $C_3 = 18\mu F$

$C_4 = 6\mu F$; $C_5 = 10{,}5\mu F$

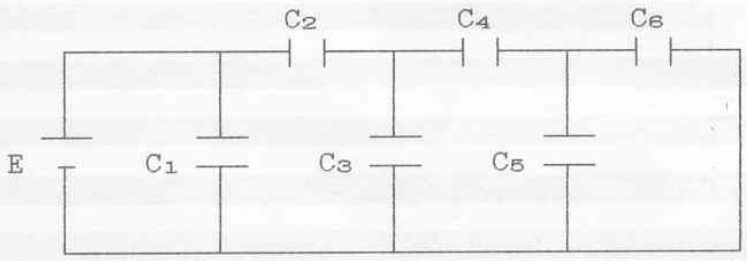
$C_6 = 30\mu F$

2.14 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



$E = 10V$

$C_1 = C_3 = C_5 = C_6 = 1pF$

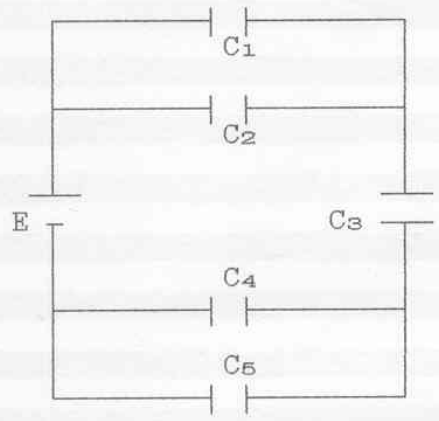
$C_2 = C_4 = 2pF$

2.15 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



$E = 10V$; $C_1 = 12nF$

$C_2 = 8nF$; $C_3 = 10nF$

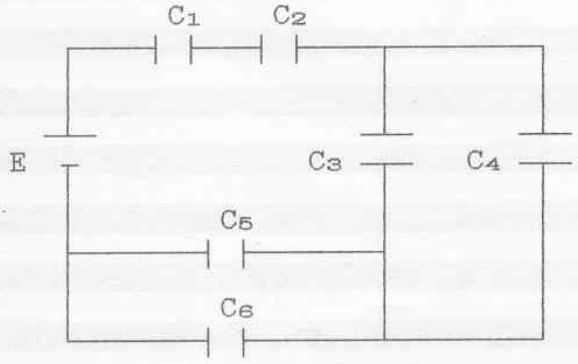
$C_4 = 12nF$; $C_5 = 13nF$

2.16 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



$E = 10V$

$C_1 = C_2 = 20\mu F$

$C_3 = 12\mu F$; $C_4 = 6\mu F$

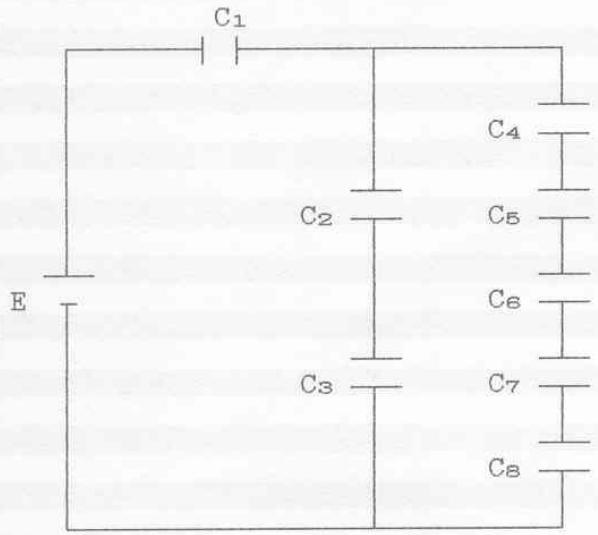
$C_5 = 10\mu F$; $C_6 = 8\mu F$

2.17 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



E = 300 V ; C_1 = 8 nF

C_2 = 3,6 nF ; C_3 = 2,4 nF

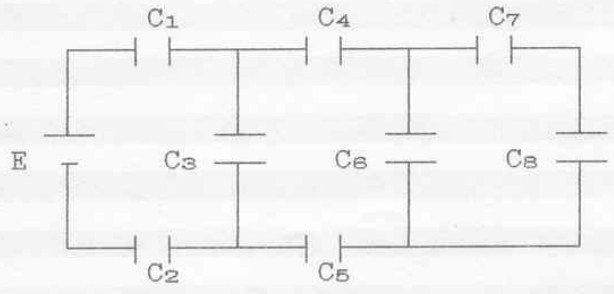
$C_4 = C_5 = C_6 = C_7 = C_8$ = 7,8 nF

2.18 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



E = 100V ; C_1 = 7μF

C_2 = 8μF ; C_3 = 6μF

C_4 = 4μF ; C_5 = 5μF

C_6 = 3μF ; C_7 = 2μF

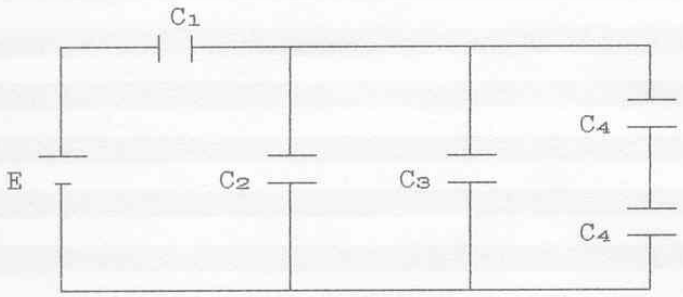
C_8 = 1μF

2.19 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



$E = 100\ V$; $C_1 = 120\ \mu F$

$C_2 = 30\ \mu F$; $C_3 = 50\ \mu F$

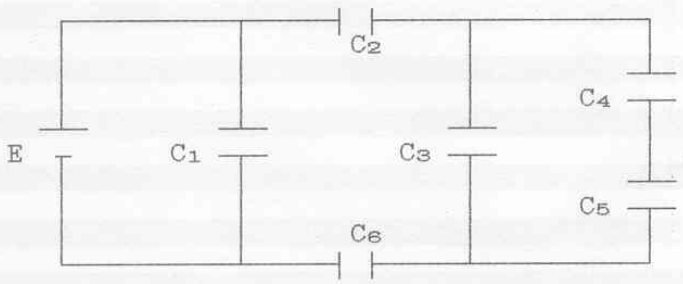
$C_4 = C_5 = 40\ \mu F$

2.20 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



$E = 100\ V$; $C_1 = 20\ \mu F$

$C_2 = 30\ \mu F$; $C_3 = 22\ \mu F$

$C_4 = 180\ \mu F$; $C_5 = 20\ \mu F$

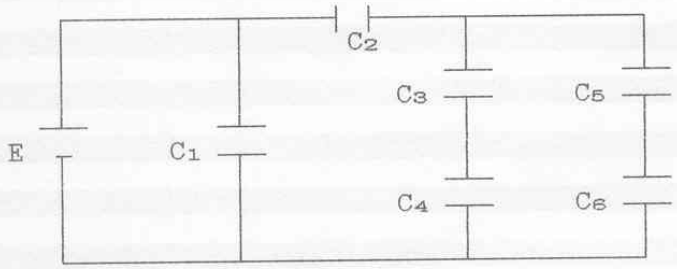
$C_6 = 10\ \mu F$

2.21 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



$E = 100\ V$; $C_1 = 12\ \mu F$

$C_2 = 30\ \mu F$; $C_3 = 180\ \mu F$

$C_4 = 20\ \mu F$; $C_5 = 60\ \mu F$

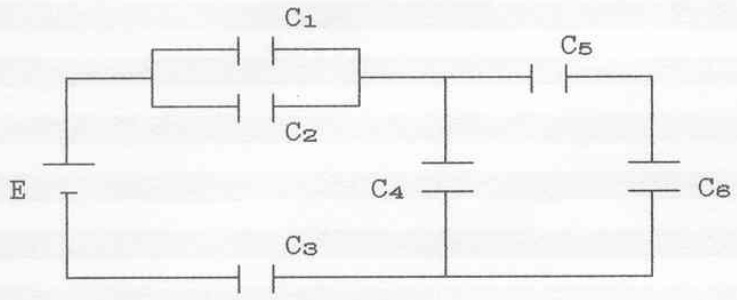
$C_6 = 60\ \mu F$

2.1 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



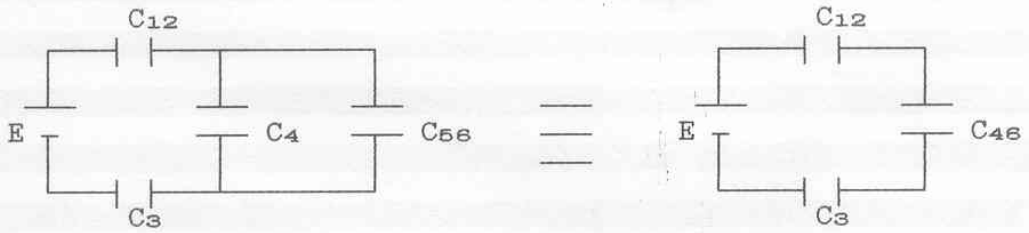
$E = 400V$; $C_1 = 20\mu F$

$C_2 = 40\mu F$; $C_3 = 60\mu F$

$C_4 = 9\mu F$; $C_5 = 30\mu F$

$C_6 = 70\mu F$

1.-



$$C_{56} = \frac{C_5 * C_6}{C_5 + C_6} = \frac{30*10^{-6} * 70*10^{-6}}{30*10^{-6} + 70*10^{-6}} = 21\ \mu F$$

$$C_{12} = C_1 + C_2 = 20*10^{-6} + 40*10^{-6} = 60\ \mu F$$

$$C_{46} = C_4 + C_{56} = 9*10^{-6} + 21*10^{-6} = 30\ \mu F$$

$$C_T = \frac{1}{\frac{1}{C_{12}} + \frac{1}{C_3} + \frac{1}{C_{46}}} = \frac{1}{\frac{1}{60*10^{-6}} + \frac{1}{60*10^{-6}} + \frac{1}{30*10^{-6}}} = 15\ \mu F$$

2.-

$$Q_T = C_T * E = 15*10^{-6} * 400 = 6000\ \mu C$$

3.-

$$Q_3 = Q_{12} = Q_{46} = Q_T = 6000\ \mu C \quad ; \quad V_3 = \frac{Q_3}{C_3} = \frac{6000*10^{-6}}{60*10^{-6}} = 100\ V$$

$$V_1 = V_2 = \frac{Q_{12}}{C_{12}} = \frac{6000*10^{-6}}{60*10^{-6}} = 100\ V$$

$$Q_1 = C_1 * V_1 = 20*10^{-6} * 100 = 2000\ \mu C$$

$$Q_2 = Q_T - Q_1 = 6000*10^{-6} - 2000*10^{-6} = 4000\ \mu C$$

$$V_4 = V_{46} = V_{56} = E - V_1 - V_3 = 400 - 100 - 100 = 200\ V$$

$$Q_4 = C_4 * V_4 = 9*10^{-6} * 200 = 1800\ \mu C$$

$$Q_5 = Q_6 = Q_{56} = Q_T - Q_4 = 6000*10^{-6} - 1800*10^{-6} = 4200\ \mu C$$

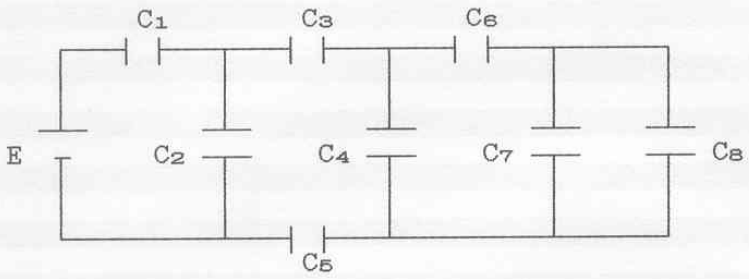
$$V_5 = \frac{Q_5}{C_5} = \frac{4200*10^{-6}}{30*10^{-6}} = 140\ V \quad ; \quad V_6 = \frac{Q_6}{C_6} = \frac{4200*10^{-6}}{70*10^{-6}} = 60\ V$$

2.2 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



$E = 200V$; $C_1 = 60\mu F$

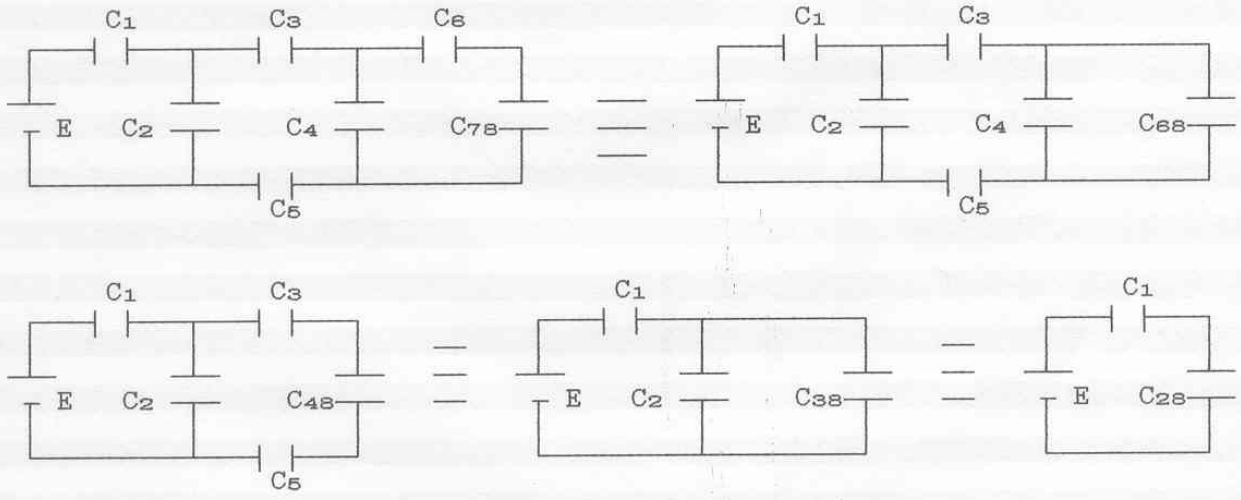
$C_2 = 10\mu F$; $C_3 = 90\mu F$

$C_4 = 25\mu F$; $C_5 = 30\mu F$

$C_6 = 30\mu F$

$C_7 = C_8 = 120\mu F$

1.-



$$C_{78} = C_7 + C_8 = 120*10^{-6} + 120*10^{-6} = 240\ \mu F$$

$$C_{68} = \frac{C_6 * C_{78}}{C_6 + C_{78}} = \frac{30*10^{-6} * 240*10^{-6}}{30*10^{-6} + 240*10^{-6}} = 26,67\ \mu F$$

$$C_{48} = C_4 + C_{68} = 25*10^{-6} + 26,67*10^{-6} = 51,67\ \mu F$$

$$C_{38} = \frac{1}{\frac{1}{C_3} + \frac{1}{C_{48}} + \frac{1}{C_5}} = \frac{1}{\frac{1}{90*10^{-6}} + \frac{1}{51,67*10^{-6}} + \frac{1}{30*10^{-6}}} = 15,67\mu F$$

$$C_{28} = C_2 + C_{38} = 10*10^{-6} + 15,67*10^{-6} = 25,67\ \mu F$$

$$C_T = \frac{C_1 * C_{28}}{C_1 + C_{28}} = \frac{60*10^{-6} * 25,67*10^{-6}}{60*10^{-6} + 25,67*10^{-6}} = 17,98\ \mu F$$

2.-

$$Q_T = C_T * E = 17,98*10^{-6} * 200 = 3,596\ mC$$

3.-

$$Q_1 = Q_{28} = Q_T = 3,596\ mC \quad ; \quad V_1 = \frac{Q_1}{C_1} = \frac{3,596*10^{-3}}{60*10^{-6}} = 59,93\ V$$

$$V_{28} = E - V_1 = 200 - 59,93 = 140,07\ V \approx 140\ V$$

$$V_2 = V_{38} = V_{28} = 140\ V \quad ; \quad Q_2 = C_2 * V_2 = 10*10^{-6} * 140 = 1,4\ mC$$

$$Q_{38} = Q_T - Q_2 = 3,596*10^{-3} - 1,4*10^{-3} = 2,196\ mC$$

$$Q_3 = Q_5 = Q_{48} = Q_{38} = 2,196\ mC \quad ; \quad V_3 = \frac{Q_3}{C_3} = \frac{2,196*10^{-3}}{90*10^{-6}} = 24,4\ V$$

$$V_5 = \frac{Q_5}{C_5} = \frac{2,196*10^{-3}}{30*10^{-6}} = 73,2\ V$$

$$V_{48} = V_{38} - V_3 - V_5 = 140 - 24,4 - 73,2 = 42,4\ V$$

$$V_4 = V_{68} = V_{48} = 42,4\ V \quad ; \quad Q_4 = C_4 * V_4 = 25*10^{-6} * 42,4 = 1,06\ mC$$

$$Q_{68} = Q_{38} - Q_4 = 2,196*10^{-3} - 1,06*10^{-3} = 1,136\ mC$$

$$Q_6 = Q_{78} = Q_{68} = 1,136\ mC \quad ; \quad V_6 = \frac{Q_6}{C_6} = \frac{1,136*10^{-3}}{30*10^{-6}} = 37,87\ V$$

$$V_7 = V_8 = V_{68} - V_6 = 42,2 - 37,87 = 4,53\ V$$

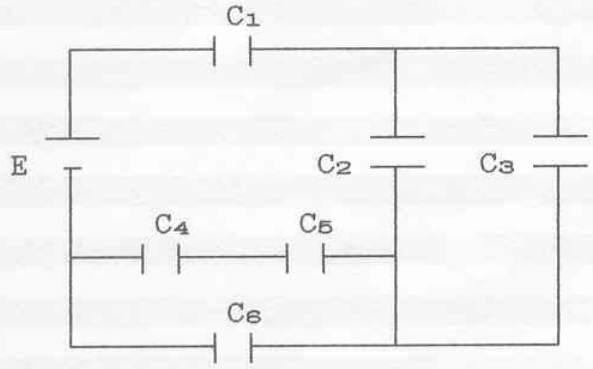
$$Q_7 = C_7 * V_7 = Q_8 = C_8 * V_8 = \frac{Q_{78}}{2} = \frac{1,136*10^{-3}}{2} = 0,568\ mC$$

2.3 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



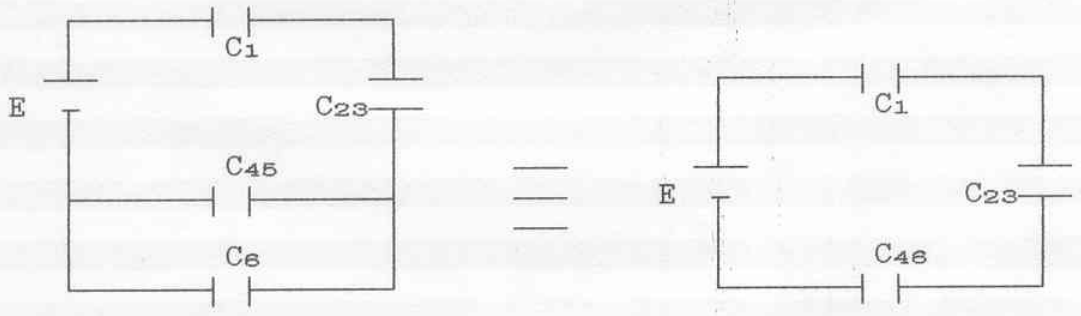
E = 100V ; C_1 = 18μF

C_2 = 10μF ; C_3 = 8μF

C_4 = 20μF ; C_5 = 12μF

C_6 = 10,5μF

1.-



$C_{23} = C_2 + C_3 = 10*10^{-6} + 8*10^{-6} = 18\ \mu F$

$$C_{45} = \frac{C_4 * C_5}{C_4 + C_5} = \frac{20*10^{-6} * 12*10^{-6}}{20*10^{-6} + 12*10^{-6}} = 7{,}5\ \mu F$$

$C_{46} = C_{45} + C_6 = 7{,}5*10^{-6} + 10{,}5*10^{-6} = 18\ \mu F$

$$C_T = \frac{C_1}{3} = \frac{18*10^{-6}}{3} = 6\ \mu F$$

2.-

$Q_T = C_T * E = 6*10^{-6} * 100 = 600\ \mu C$

3.-

$Q_1 = Q_{23} = Q_{46} = Q_T = 600\ \mu C$; $V_1 = V_{23} = V_{46} = \frac{E}{3} = \frac{100}{3} = 33,34\ V$

$V_2 = V_3 = V_{23} = 33,34\ V$; $Q_2 = C_2 * V_2 = 10*10^{-6} * 33,34 = 333,4\ \mu C$

$Q_3 = C_3 * V_3 = 8*10^{-6} * 33,34 = 266,67\ \mu C$; $V_6 = V_{45} = V_{46} = 33,34\ V$

$Q_6 = C_6 * V_6 = 10,5*10^{-6} * 33,34 = 350\ \mu C$

$Q_4 = Q_5 = C_{45} * V_{45} = 7,5*10^{-6} * 33,34 = 250\ \mu C$

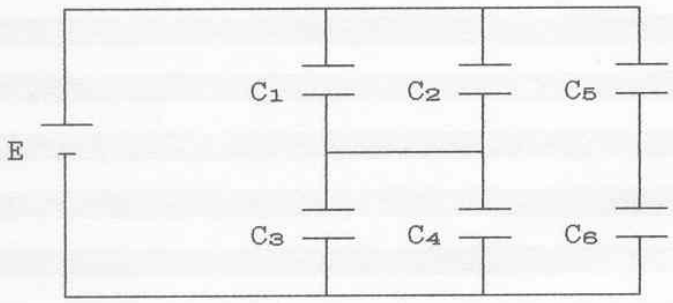
$V_4 = \frac{Q_4}{C_4} = \frac{250*10^{-6}}{20*10^{-6}} = 12,5\ V$; $V_5 = \frac{Q_5}{C_5} = \frac{250*10^{-6}}{12*10^{-6}} = 20,83\ V$

2.4 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



$E = 100V$; $C_1 = 12\mu F$

$C_2 = 6\mu F$; $C_3 = 10\mu F$

$C_4 = 8\mu F$; $C_5 = 20\mu F$

$C_6 = 12\mu F$

1.-

$$C_{12} = C_1 + C_2 = 12*10^{-6} + 6*10^{-6} = 18\ \mu F$$

$$C_{34} = C_3 + C_4 = 10*10^{-6} + 8*10^{-6} = 18\ \mu F$$

$$C_{56} = \frac{C_5 * C_6}{C_5 + C_6} = \frac{20*10^{-6} * 12*10^{-6}}{20*10^{-6} + 12*10^{-6}} = 7,5\ \mu F$$

$$C_{14} = \frac{C_{12}}{2} = \frac{18*10^{-6}}{2} = 9\ \mu F$$

$$C_T = C_{14} + C_{56} = 9*10^{-6} + 7,5*10^{-6} = 16,5\ \mu F$$

2.-

$Q_T = C_T * E = 16{,}5*10^{-6} * 100 = 1{,}65 \text{ mC}$

3.-

$V_{14} = V_{56} = E = 100 \text{ V}$

$Q_{12} = Q_{34} = Q_{14} = C_{14} * V_{14} = 9*10^{-6} * 100 = 900 \ \mu\text{C}$

$Q_5 = Q_6 = Q_{56} = C_{56} * V_{56} = 7{,}5*10^{-6} * 100 = 750 \ \mu\text{C}$

$$V_5 = \frac{Q_5}{C_5} = \frac{750*10^{-6}}{20*10^{-6}} = 37{,}5 \text{ V} \quad ; \quad V_6 = \frac{Q_6}{C_6} = \frac{750*10^{-6}}{12*10^{-6}} = 62{,}5 \text{ V}$$

$$V_1 = V_2 = V_3 = V_4 = \frac{Q_{12}}{C_{12}} = \frac{900*10^{-6}}{18*10^{-6}} = 50 \text{ V}$$

$Q_1 = C_1 * V_1 = 12*10^{-6} * 50 = 600 \ \mu\text{C}$

$Q_2 = C_2 * V_2 = 6*10^{-6} * 50 = 300 \ \mu\text{C}$

$Q_3 = C_3 * V_3 = 10*10^{-6} * 50 = 500 \ \mu\text{C}$

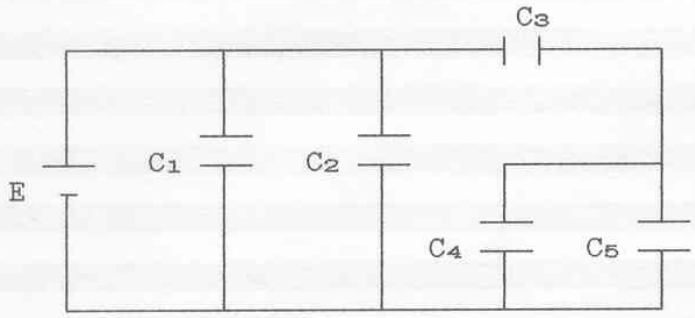
$Q_4 = C_4 * V_4 = 8*10^{-6} * 50 = 400 \ \mu\text{C}$

2.5 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



$E = 10V$; $C_1 = 1,4\mu F$

$C_2 = 2,1\mu F$; $C_3 = 3,5\mu F$

$C_4 = 1,2\mu F$; $C_5 = 1,3\mu F$

1.-

$C_{12} = C_1 + C_2 = 1,4*10^{-6} + 2,1*10^{-6} = 3,5\ \mu F$

$C_{45} = C_4 + C_5 = 1,2*10^{-6} + 1,3*10^{-6} = 2,5\ \mu F$

$$C_{35} = \frac{C_3 * C_{45}}{C_3 + C_{45}} = \frac{3,5*10^{-6} * 2,5*10^{-6}}{3,5*10^{-6} + 2,5*10^{-6}} = 1,46\ \mu F$$

$C_T = C_{12} + C_{35} = 3,5*10^{-6} + 1,46*10^{-6} = 4,96\ \mu F$

2.-

$Q_T = C_T * E = 4,96*10^{-6} * 10 = 49,6\ \mu C$

3.-

$V_{35} = V_1 = V_2 = E = 10\ V$; $Q_1 = C_1 * V_1 = 1{,}4*10^{-6} * 10 = 14\ \mu C$

$Q_2 = C_2 * V_2 = 2{,}1*10^{-6} * 10 = 21\ \mu C$

$Q_3 = Q_{45} = Q_T - Q_1 - Q_2 = 49{,}6*10^{-6} - 14*10^{-6} - 21*10^{-6} = 14{,}6\ \mu C$

$$V_3 = \frac{Q_3}{C_3} = \frac{14{,}6*10^{-6}}{3{,}5*10^{-6}} = 4{,}17\ V$$

$V_4 = V_5 = V_{35} - V_3 = 10 - 4{,}17 = 5{,}83\ V$

$Q_4 = C_4 * V_4 = 1{,}2*10^{-6} * 5{,}83 = 6{,}996\ \mu C$

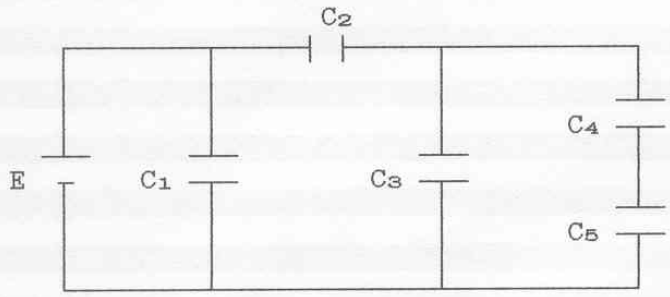
$Q_5 = C_5 * V_5 = 1{,}3*10^{-6} * 5{,}83 = 7{,}579\ \mu C$

2.6 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.

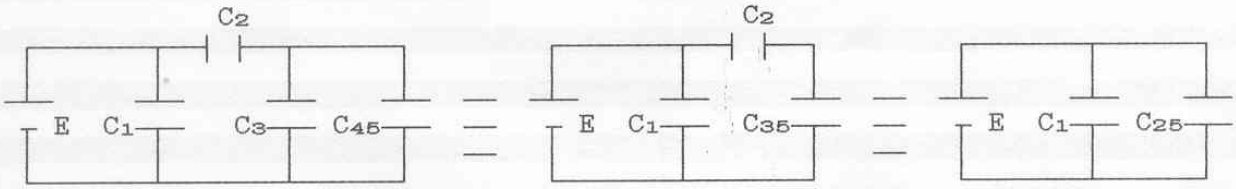


$E = 100V$; $C_1 = 4\mu F$

$C_2 = 12\mu F$; $C_3 = 8\mu F$

$C_4 = 12\mu F$; $C_5 = 6\mu F$

1.-



$$C_{45} = \frac{C_4 * C_5}{C_4 + C_5} = \frac{12*10^{-6} * 6*10^{-6}}{12*10^{-6} + 6*10^{-6}} = 4\ \mu F$$

$$C_{35} = C_3 + C_{45} = 8*10^{-6} + 4*10^{-6} = 12\ \mu F$$

$$C_{25} = \frac{C_2}{2} = \frac{12*10^{-6}}{2} = 6\ \mu F$$

$$C_T = C_1 + C_{25} = 4*10^{-6} + 6*10^{-6} = 10\ \mu F$$

2.-

$$Q_T = C_T * E = 10*10^{-6} * 100 = 1000\ \mu C$$

3.-

$V_1 = V_{25} = E = 100\ V \quad ; \quad Q_1 = C_1 * V_1 = 4*10^{-6} * 100 = 400\ \mu C$

$Q_2 = Q_{35} = Q_{25} = Q_T - Q_1 = 1000*10^{-6} - 400*10^{-6} = 600\ \mu C$

$$V_2 = V_{35} = V_3 = V_{45} = \frac{V_{25}}{2} = \frac{100}{2} = 50\ V$$

$Q_3 = C_3 * V_3 = 8*10^{-6} * 50 = 400\ \mu C$

$Q_4 = Q_5 = Q_{45} = Q_{35} - Q_3 = 600*10^{-6} - 400*10^{-6} = 200\ \mu C$

$$V_4 = \frac{Q_4}{C_4} = \frac{200*10^{-6}}{12*10^{-6}} = 16,67\ V$$

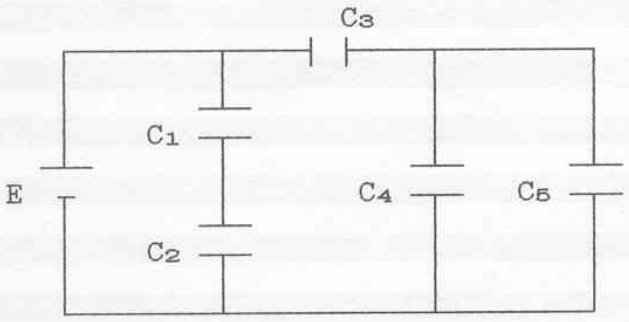
$$V_5 = \frac{Q_5}{C_5} = \frac{200*10^{-6}}{6*10^{-6}} = 33,33\ V$$

2.7 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.

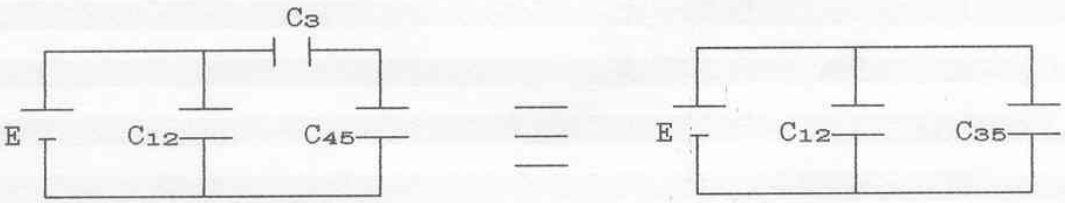


$E = 200V$; $C_1 = 8\mu F$

$C_2 = 12\mu F$; $C_3 = 8\mu F$

$C_4 = 20\mu F$; $C_5 = 5\mu F$

1.-



$$C_{12} = \frac{C_1 * C_2}{C_1 + C_2} = \frac{8*10^{-6} * 12*10^{-6}}{8*10^{-6} + 12*10^{-6}} = 4{,}8\ \mu F$$

$$C_{45} = C_4 + C_5 = 20*10^{-6} + 5*10^{-6} = 25\ \mu F$$

$$C_{35} = \frac{C_3 * C_{45}}{C_3 + C_{45}} = \frac{8*10^{-6} * 25*10^{-6}}{8*10^{-6} + 25*10^{-6}} = 6{,}06\ \mu F$$

$$C_T = C_{12} + C_{35} = 4{,}8*10^{-6} + 6{,}06*10^{-6} = 10{,}86\ \mu F$$

2.-

$$Q_T = C_T * E = 10{,}86*10^{-6} * 200 = 2172\ \mu C$$

3.-

$V_{12} = V_{35} = E = 200\ V$

$Q_1 = Q_2 = Q_{12} = C_{12} * V_{12} = 4{,}8*10^{-6} * 200 = 960\ \mu C$

$Q_3 = Q_{45} = Q_{35} = C_{35} * V_{35} = 6{,}06*10^{-6} * 200 = 1212\ \mu C$

$$V_1 = \frac{Q_1}{C_1} = \frac{960*10^{-6}}{8*10^{-6}} = 120\ V$$

$V_2 = V_{12} - V_1 = 200 - 120 = 80\ V$

$$V_3 = \frac{Q_3}{C_3} = \frac{1212*10^{-6}}{8*10^{-6}} = 151{,}5\ V$$

$V_4 = V_5 = V_{45} = V_{35} - V_3 = 200 - 151{,}5 = 48{,}5\ V$

$Q_4 = C_4 * V_4 = 20*10^{-6} * 48{,}5 = 970\ \mu C$

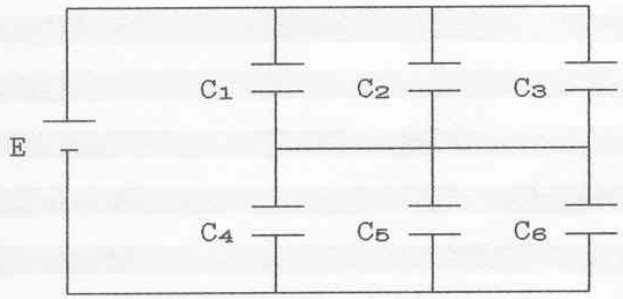
$Q_5 = C_5 * V_5 = 5*10^{-6} * 48{,}5 = 242\ \mu C$

2.8 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



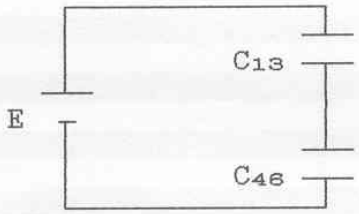
$E = 100V$; $C_1 = 1,2\mu F$

$C_2 = 1,3\mu F$; $C_3 = 2,5\mu F$

$C_4 = 1,4\mu F$; $C_5 = 2,1\mu F$

$C_6 = 2,5\mu F$

1.-



$$C_{13} = C_1 + C_2 + C_3 = 1,2*10^{-6} + 1,3*10^{-6} + 2,5*10^{-6} = 5\ \mu F$$

$$C_{46} = C_4 + C_5 + C_6 = 1,4*10^{-6} + 2,1*10^{-6} + 2,5*10^{-6} = 6\ \mu F$$

$$C_T = \frac{C_{13} * C_{46}}{C_{13} + C_{46}} = \frac{5*10^{-6} * 6*10^{-6}}{5*10^{-6} + 6*10^{-6}} = 2,73\ \mu F$$

2.-

$$Q_T = C_T * E = 2,73*10^{-6} * 100 = 273\ \mu C$$

3.-

$Q_{13} = Q_{46} = Q_T = 273\ \mu C$

$$V_1 = V_2 = V_3 = \frac{Q_{13}}{C_{13}} = \frac{273*10^{-6}}{5*10^{-6}} = 54,55\ V$$

$$V_4 = V_5 = V_6 = \frac{Q_{46}}{C_{46}} = \frac{273*10^{-6}}{6*10^{-6}} = 45,45\ V$$

$Q_1 = C_1 * V_1 = 1,2*10^{-6} * 54,55 = 65,45\ \mu C$

$Q_2 = C_2 * V_2 = 1,3*10^{-6} * 54,55 = 70,91\ \mu C$

$Q_3 = C_3 * V_3 = 2,5*10^{-6} * 54,55 = 136,37\ \mu C$

$Q_4 = C_4 * V_4 = 1,4*10^{-6} * 45,45 = 63,64\ \mu C$

$Q_5 = C_5 * V_5 = 2,1*10^{-6} * 45,45 = 95,45\ \mu C$

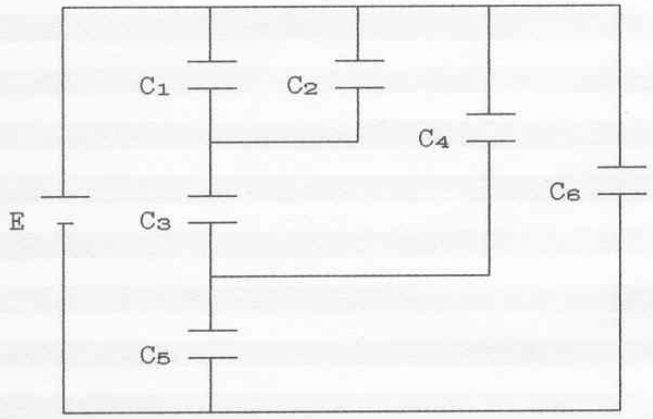
$Q_6 = C_6 * V_6 = 2,5*10^{-6} * 45,45 = 113,63\ \mu C$

2.9 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



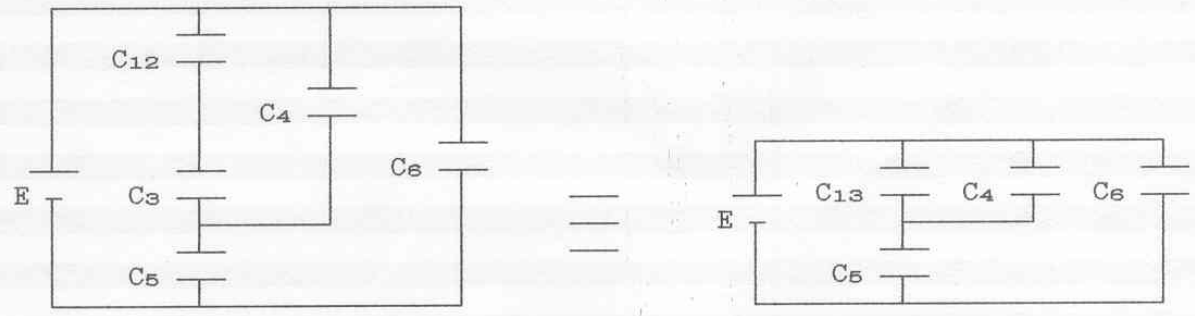
E = 100V

$C_1 = C_2 = C_4 = 0{,}5nF$

$C_3 = C_5 = 1nF$

$C_6 = 2nF$

1.-



$C_{12} = C_1 + C_2 = 2 * C_1 = 2 * 0{,}5*10^{-9} = 1\ nF$

$$C_{13} = \frac{C_3}{2} = \frac{1*10^{-9}}{2} = 0,5 \text{ nF}$$

$$C_{14} = C_{13} + C_4 = 2 * C_4 = 2 * 0,5*10^{-9} = 1 \text{ nF}$$

$$C_{15} = \frac{C_5}{2} = \frac{1*10^{-9}}{2} = 0,5 \text{ nF}$$

$$C_T = C_{16} = C_{15} + C_6 = 0,5*10^{-9} + 2*10^{-9} = 2,5 \text{ nF}$$

2.-

$$Q_T = C_T * E = 2,5*10^{-9} * 100 = 250 \text{ nC}$$

3.-

$$V_6 = E = 100 \text{ V}$$

$$Q_6 = C_6 * E = 2*10^{-9} * 100 = 200 \text{ nC}$$

$$Q_{15} = Q_5 = Q_{14} = Q_T - Q_6 = 250*10^{-9} - 200*10^{-9} = 50 \text{ nC}$$

$$V_5 = V_{14} = V_4 = V_{13} = \frac{Q_5}{C_5} = \frac{50*10^{-9}}{1*10^{-9}} = 50 \text{ V}$$

$$Q_4 = Q_{13} = Q_3 = Q_{12} = \frac{Q_{14}}{2} = \frac{50*10^{-9}}{2} = 25 \text{ nC}$$

$$V_3 = V_{12} = V_1 = V_2 = \frac{V_{13}}{2} = \frac{50}{2} = 25 \text{ V}$$

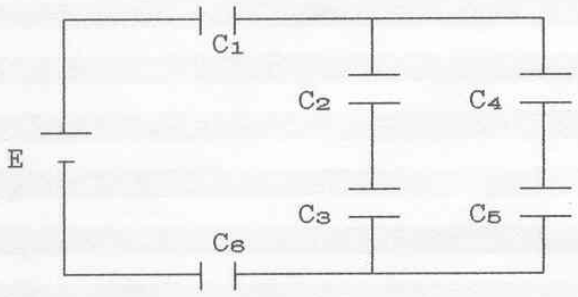
$$Q_1 = Q_2 = \frac{Q_{12}}{2} = \frac{25*10^{-9}}{2} = 12,5 \text{ nC}$$

2.10 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



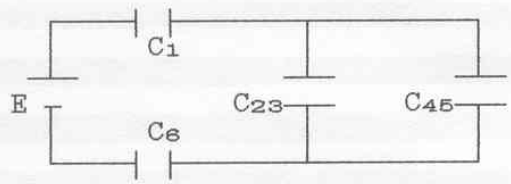
$E = 100V$; $C_1 = 12\mu F$

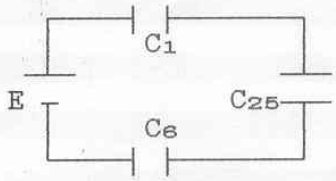
$C_2 = 180\mu F$; $C_3 = 20\mu F$

$C_4 = C_5 = 60\mu F$

$C_6 = 2,4\mu F$

1.-





$$C_{23} = \frac{C_2 * C_3}{C_2 + C_3} = \frac{180*10^{-6} * 20*10^{-6}}{180*10^{-6} + 20*10^{-6}} = 18\ \mu F$$

$$C_{45} = \frac{C_4}{2} = \frac{60*10^{-6}}{2} = 30\ \mu F$$

$$C_{25} = C_{23} + C_{45} = 18*10^{-6} + 30*10^{-6} = 48\ \mu F$$

$$C_T = \frac{1}{\frac{1}{C_1} + \frac{1}{C_{25}} + \frac{1}{C_6}} = \frac{1}{\frac{1}{12*10^{-6}} + \frac{1}{48*10^{-6}} + \frac{1}{2,4*10^{-6}}} = 1,92\ \mu F$$

2.-

$$Q_T = C_T * E = 1{,}92*10^{-6} * 100 = 192\ \mu C$$

3.-

$$Q_1 = Q_6 = Q_{25} = Q_T = 192\ \mu C$$

$$V_1 = \frac{Q_1}{C_1} = \frac{192*10^{-6}}{12*10^{-6}} = 16\ V$$

$$V_6 = \frac{Q_6}{C_6} = \frac{192*10^{-6}}{2{,}4*10^{-6}} = 80\ V$$

$$V_{25} = V_{23} = V_{45} = \frac{Q_{25}}{C_{25}} = \frac{192*10^{-6}}{48*10^{-6}} = 4\ V$$

$$Q_2 = Q_3 = C_{23} * V_{23} = 18*10^{-6} * 4 = 72\ \mu C$$

$$Q_4 = Q_5 = C_{45} * V_{45} = 30*10^{-6} * 4 = 120\ \mu C$$

$$V_2 = \frac{Q_2}{C_2} = \frac{72*10^{-6}}{180*10^{-6}} = 0{,}4\ V$$

$$V_3 = \frac{Q_3}{C_3} = \frac{72*10^{-6}}{20*10^{-6}} = 3{,}6\ V$$

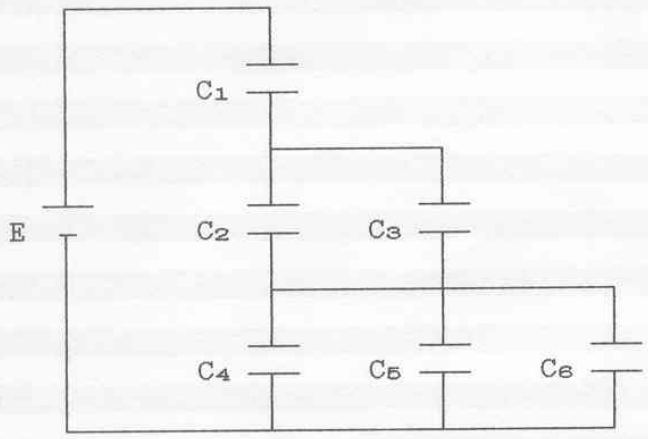
$$V_4 = V_5 = \frac{V_{45}}{2} = \frac{4}{2} = 2\ V$$

2.11 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



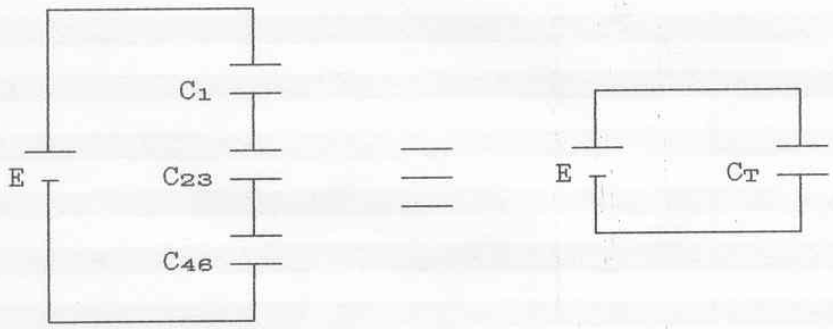
E = 62,5V ; C_1 = 10nF

C_2 = 15nF ; C_3 = 5nF

C_4 = 3nF ; C_5 = 5nF

C_6 = 2nF

1.-



$C_{23} = C_2 + C_3 = 15*10^{-9} + 5*10^{-9} = 20$ nF

$C_{46} = C_4 + C_5 + C_6 = 3*10^{-9} + 5*10^{-9} + 2*10^{-9} = 10$ nF

$$C_T = \frac{1}{\frac{1}{C_1} + \frac{1}{C_{23}} + \frac{1}{C_{46}}} = \frac{1}{\frac{1}{10*10^{-9}} + \frac{1}{20*10^{-9}} + \frac{1}{10*10^{-9}}} = 4 \text{ nF}$$

2.-

$$Q_T = C_T * E = 4*10^{-9} * 62,5 = 250 \text{ nC}$$

3.-

$$Q_1 = Q_{23} = Q_{46} = Q_T = 250 \text{ nC}$$

$$V_1 = \frac{Q_1}{C_1} = \frac{250*10^{-9}}{10*10^{-9}} = 25 \text{ V}$$

$$V_2 = V_3 = V_{23} = \frac{Q_{23}}{C_{23}} = \frac{250*10^{-9}}{20*10^{-9}} = 12,5 \text{ V}$$

$$V_4 = V_5 = V_6 = V_{46} = \frac{Q_{46}}{C_{46}} = \frac{250*10^{-9}}{10*10^{-9}} = 25 \text{ V}$$

$$Q_2 = C_2 * V_2 = 15*10^{-9} * 12,5 = 187,5 \text{ nC}$$

$$Q_3 = C_3 * V_3 = 5*10^{-9} * 12,5 = 62,5 \text{ nC}$$

$$Q_4 = C_4 * V_4 = 3*10^{-9} * 25 = 75 \text{ nC}$$

$$Q_5 = C_5 * V_5 = 5*10^{-9} * 25 = 125 \text{ nC}$$

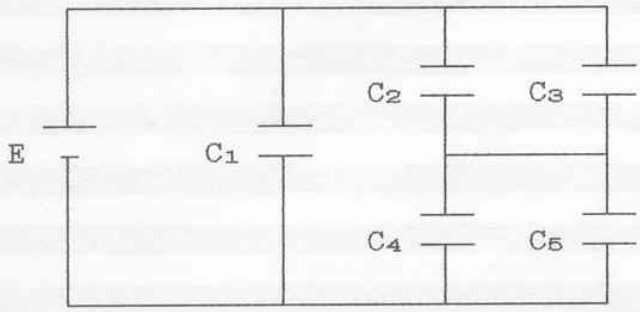
$$Q_6 = C_6 * V_6 = 2*10^{-9} * 25 = 50 \text{ nC}$$

2.12 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



$E = 100V$; $C_1 = 1,75\mu F$

$C_2 = 1,2\mu F$; $C_3 = 1,3\mu F$

$C_4 = 1,4\mu F$; $C_5 = 2,1\mu F$

1.-

$C_{23} = C_2 + C_3 = 1,2*10^{-6} + 1,3*10^{-6} = 2,5\ \mu F$

$C_{45} = C_4 + C_5 = 1,4*10^{-6} + 2,1*10^{-6} = 3,5\ \mu F$

$$C_{25} = \frac{C_{23} * C_{45}}{C_{23} + C_{45}} = \frac{2,5*10^{-6} * 3,5*10^{-6}}{2,5*10^{-6} + 3,5*10^{-6}} = 1,46\ \mu F$$

$C_T = C_{15} = C_1 + C_{25} = 1,75*10^{-6} + 1,46*10^{-6} = 3,21\ \mu F$

2.-

$Q_T = C_T * E = 3,21*10^{-6} * 100 = 321\ \mu C$

3.-

$V_1 = V_{25} = E = 100\ V$

$Q_1 = C_1 * V_1 = 1{,}75*10^{-6} * 100 = 175\ \mu C$

$Q_{25} = Q_{23} = Q_{45} = C_{25} * V_{25} = 1{,}46*10^{-6} * 100 = 146\ \mu C$

$$V_2 = V_3 = V_{23} = \frac{Q_{23}}{C_{23}} = \frac{146*10^{-6}}{2{,}5*10^{-6}} = 58{,}4\ V$$

$$V_4 = V_5 = V_{45} = \frac{Q_{45}}{C_{45}} = \frac{146*10^{-6}}{3{,}5*10^{-6}} = 41{,}6\ V$$

$Q_2 = C_2 * V_2 = 1{,}2*10^{-6} * 58{,}4 = 70{,}08\ \mu C$

$Q_3 = C_3 * V_3 = 1{,}3*10^{-6} * 58{,}4 = 75{,}92\ \mu C$

$Q_4 = C_4 * V_4 = 1{,}4*10^{-6} * 41{,}6 = 58{,}24\ \mu C$

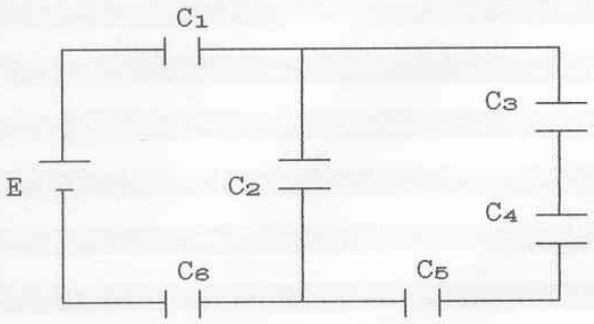
$Q_5 = C_5 * V_5 = 2{,}1*10^{-6} * 41{,}6 = 87{,}36\ \mu C$

2.13 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



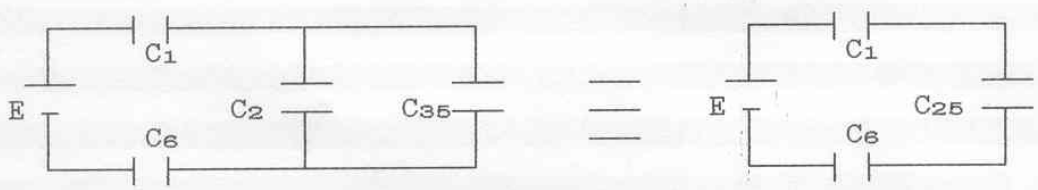
E = 10V ; C_1 = 30μF

C_2 = 1,85μF ; C_3 = 18μF

C_4 = 6μF ; C_5 = 10,5μF

C_6 = 30μF

1.-



$$C_{35} = \frac{1}{\frac{1}{C_3} + \frac{1}{C_4} + \frac{1}{C_5}} = \frac{1}{\frac{1}{18*10^{-6}} + \frac{1}{6*10^{-6}} + \frac{1}{10,5*10^{-6}}} = 3,15\ \mu F$$

$$C_{25} = C_2 + C_{35} = 1,85*10^{-6} + 3,15*10^{-6} = 5\ \mu F$$

$$C_T = \frac{1}{\frac{1}{C_1} + \frac{1}{C_{25}} + \frac{1}{C_6}} = \frac{1}{\frac{1}{30*10^{-6}} + \frac{1}{5*10^{-6}} + \frac{1}{30*10^{-6}}} = 3,75\ \mu F$$

2.-

$$Q_T = C_T * E = 3,75*10^{-6} * 10 = 37,5\ \mu C$$

3.-

$$Q_1 = Q_{25} = Q_6 = Q_T = 37,5\ \mu C$$

$$V_1 = V_6 = \frac{Q_1}{C_1} = \frac{37,5*10^{-6}}{30*10^{-6}} = 1,25\ V$$

$$V_2 = V_{25} = V_{35} = \frac{Q_{25}}{C_{25}} = \frac{37,5*10^{-6}}{5*10^{-6}} = 7,5\ V$$

$$Q_2 = C_2 * V_2 = 1,85*10^{-6} * 7,5 = 13,875\ \mu C$$

$$Q_3 = Q_4 = Q_5 = Q_{35} = C_{35} * V_{35} = 7,5*10^{-6} * 3,15 = 23,625\ \mu C$$

$$V_3 = \frac{Q_3}{C_3} = \frac{23,625*10^{-6}}{18*10^{-6}} = 1,3125\ V$$

$$V_4 = \frac{Q_4}{C_4} = \frac{23,625*10^{-6}}{6*10^{-6}} = 3,9375\ V$$

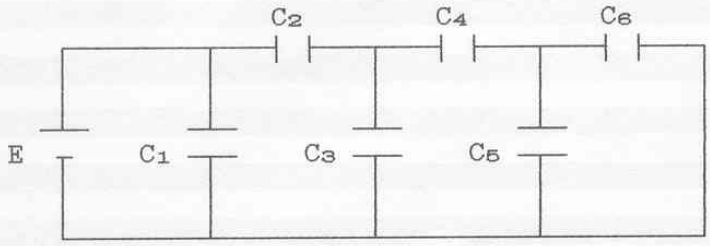
$$V_5 = \frac{Q_5}{C_5} = \frac{23,625*10^{-6}}{10,5*10^{-6}} = 2,25\ V$$

2.14 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.

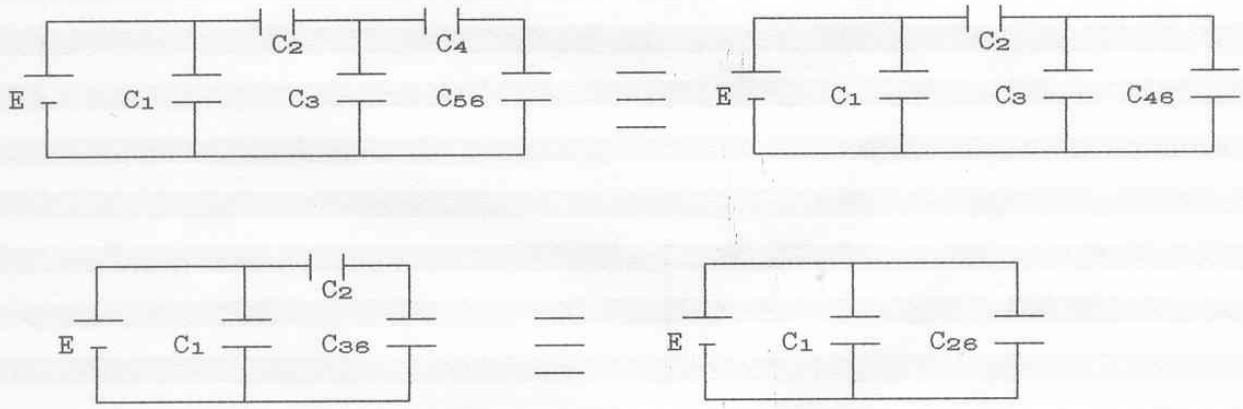


$E = 10V$

$C_1 = C_3 = C_5 = C_6 = 1pF$

$C_2 = C_4 = 2pF$

1.-



$$C_{56} = C_5 + C_6 = 2 * C_5 = 2 * 1*10^{-12} = 2\ pF$$

$$C_{46} = \frac{C_4 * C_{56}}{C_4 + C_{56}} = \frac{C_4}{2} = \frac{2*10^{-12}}{2} = 1\ pF$$

$$C_{36} = C_3 + C_{46} = 2 * C_3 = 2 * 1*10^{-12} = 2\ pF$$

$$C_{26} = \frac{C_2 * C_{36}}{C_2 + C_{36}} = \frac{C_2}{2} = \frac{2*10^{-12}}{2} = 1\ pF$$

$$C_T = C_{16} = C_1 + C_{26} = 2 * C_1 = 2 * 1*10^{-12} = 2\ pF$$

2.-

$$Q_T = C_T * E = 2*10^{-12} * 10 = 20 \text{ pC}$$

3.-

$$V_1 = V_{26} = E = 10 \text{ V}$$

$$Q_1 = Q_{26} = Q_2 = Q_{36} = \frac{Q_T}{2} = \frac{20*10^{-12}}{2} = 10 \text{ pC}$$

$$Q_3 = Q_{45} = \frac{Q_2}{2} = \frac{10*10^{-12}}{2} = 5 \text{ pC}$$

$$V_2 = V_{36} = V_3 = V_{46} = \frac{E}{2} = \frac{10}{2} = 5 \text{ V}$$

$$V_4 = V_5 = V_6 = \frac{V_{46}}{2} = \frac{5}{2} = 2,5 \text{ V}$$

$$Q_4 = Q_{56} = \frac{Q_{36}}{2} = \frac{5*10^{-12}}{2} = 2,5 \text{ pC}$$

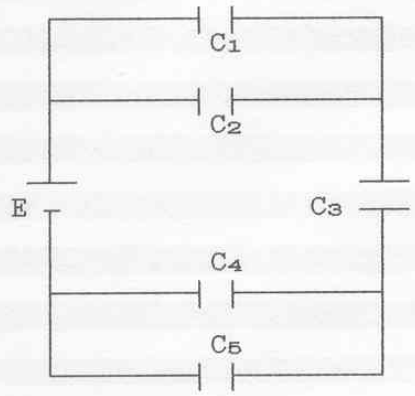
$$Q_5 = Q_6 = \frac{Q_{56}}{2} = \frac{2,5*10^{-12}}{2} = 1,25 \text{ pC}$$

2.15 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.

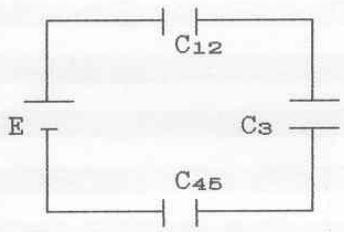


$E = 10V$; $C_1 = 12nF$

$C_2 = 8nF$; $C_3 = 10nF$

$C_4 = 12nF$; $C_5 = 13nF$

1.-



$C_{12} = C_1 + C_2 = 12*10^{-9} + 8*10^{-9} = 20\ nF$

$C_{45} = C_4 + C_5 = 12*10^{-9} + 13*10^{-9} = 25\ nF$

$$C_T = \frac{1}{\frac{1}{C_{12}} + \frac{1}{C_3} + \frac{1}{C_{45}}} = \frac{1}{\frac{1}{20*10^{-9}} + \frac{1}{10*10^{-9}} + \frac{1}{25*10^{-9}}} = 5,26\ nF$$

2.-

$Q_T = C_T * E = 5,26*10^{-9} * 10 = 52,6\ nC$

3.-

$$Q_{12} = Q_3 = Q_{45} = Q_T = 52,6 \text{ nC}$$

$$V_1 = V_2 = V_{12} = \frac{Q_{12}}{C_{12}} = \frac{52,6*10^{-9}}{20*10^{-9}} = 2,63 \text{ V}$$

$$V_3 = \frac{Q_3}{C_3} = \frac{52,6*10^{-9}}{10*10^{-9}} = 5,26 \text{ V}$$

$$V_4 = V_5 = V_{45} = \frac{Q_{45}}{C_{45}} = \frac{52,6*10^{-9}}{25*10^{-9}} = 2,1 \text{ V}$$

$$Q_1 = C_1 * V_1 = 12*10^{-9} * 2,63 = 31,56 \text{ nC}$$

$$Q_2 = C_2 * V_2 = 8*10^{-9} * 2,63 = 21,04 \text{ nC}$$

$$Q_4 = C_4 * V_4 = 12*10^{-9} * 2,1 = 25,2 \text{ nC}$$

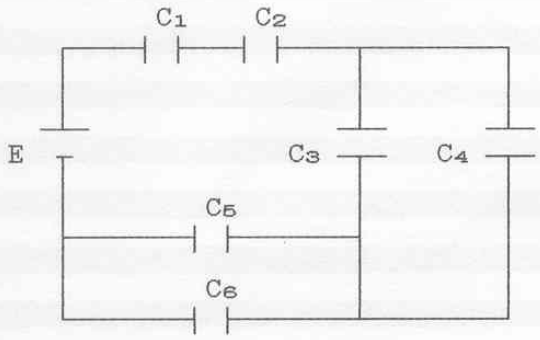
$$Q_5 = C_5 * V_5 = 13*10^{-9} * 2,1 = 27,3 \text{ nC}$$

2.16 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



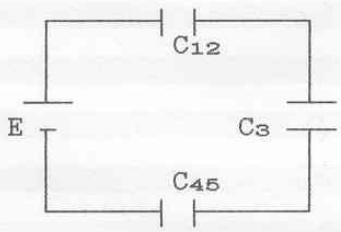
$E = 10V$

$C_1 = C_2 = 20\mu F$

$C_3 = 12\mu F$; $C_4 = 6\mu F$

$C_5 = 10\mu F$; $C_6 = 8\mu F$

1.-



$$C_{12} = \frac{C_1 * C_2}{C_1 + C_2} = \frac{C_1}{2} = \frac{20*10^{-6}}{2} = 10\ \mu F$$

$$C_{34} = C_3 + C_4 = 12*10^{-6} + 6*10^{-6} = 18\ \mu F$$

$$C_{56} = C_5 + C_6 = 10*10^{-6} + 8*10^{-6} = 18\ \mu F$$

$$C_T = \frac{1}{\frac{1}{C_{12}} + \frac{1}{C_{34}} + \frac{1}{C_{56}}} = \frac{1}{\frac{1}{10*10^{-6}} + \frac{1}{18*10^{-6}} + \frac{1}{18*10^{-6}}} = 4,74\mu F$$

2.-

$$Q_T = Q_{12} = Q_{34} = Q_{56} = C_T * E = 4{,}74*10^{-6} * 10 = 47{,}4\ \mu C$$

3.-

$$Q_{12} = Q_{34} = Q_{56} = Q_T = 47{,}4\ \mu C$$

$$V_{12} = \frac{Q_{12}}{C_{12}} = \frac{47{,}4*10^{-6}}{10*10^{-6}} = 4{,}74\ V$$

$$V_1 = V_2 = V_{12} = \frac{V_{12}}{2} = \frac{4{,}74}{2} = 2{,}37\ V$$

$$Q_1 = Q_2 = Q_{12} = Q_T = 47{,}4\ \mu C$$

$$V_3 = V_4 = V_{34} = \frac{Q_{34}}{C_{34}} = \frac{47{,}4*10^{-6}}{18*10^{-6}} = 2{,}63\ V$$

$$V_5 = V_6 = V_{56} = \frac{Q_{56}}{C_{56}} = \frac{47{,}4*10^{-6}}{18*10^{-6}} = 2{,}63\ V$$

$$Q_3 = C_3 * V_3 = 12*10^{-6} * 2{,}63 = 31{,}6\ \mu C$$

$$Q_4 = C_4 * V_4 = 6*10^{-6} * 2{,}63 = 15{,}8\ \mu C$$

$$Q_5 = C_5 * V_5 = 10*10^{-6} * 2{,}63 = 26{,}3\ \mu C$$

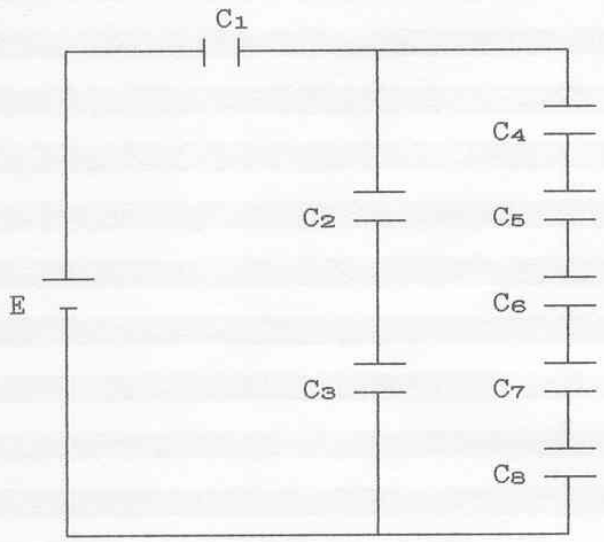
$$Q_6 = C_6 * V_6 = 8*10^{-6} * 2{,}63 = 21{,}06\ \mu C$$

2.17 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.

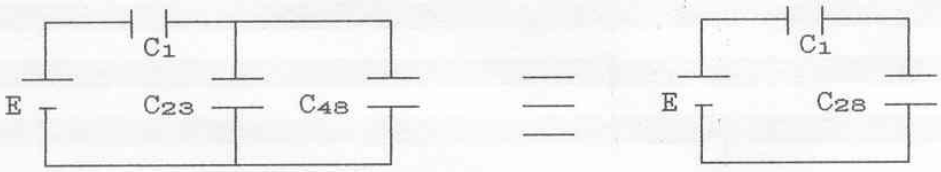


$E = 300\ V$; $C_1 = 8\ nF$

$C_2 = 3,6\ nF$; $C_3 = 2,4\ nF$

$C_4 = C_5 = C_6 = C_7 = C_8 = 7,8\ nF$

1.-



$$C_{23} = \frac{C_2 * C_3}{C_2 + C_3} = \frac{3,6*10^{-9} * 2,4*10^{-9}}{3,6*10^{-9} + 2,4*10^{-9}} = 1,44\ nF$$

$$C_{48} = \frac{C_4}{5} = \frac{7,8*10^{-9}}{5} = 1,56\ nF$$

$$C_{28} = C_{23} + C_{48} = 1,44*10^{-9} + 1,56*10^{-9} = 3\ nF$$

$$C_T = \frac{C_1 * C_{28}}{C_1 + C_{28}} = \frac{3*10^{-9} * 8*10^{-9}}{3*10^{-9} + 8*10^{-9}} = 2,18\ nF$$

2.-

$$Q_T = C_T * E = 2,18*10^{-9} * 300 = 654,54 \text{ nC}$$

3.-

$$Q_1 = Q_{28} = Q_T = 654,54 \text{ nC}$$

$$V_1 = \frac{Q_1}{C_1} = \frac{654,54*10^{-9}}{8*10^{-9}} = 81,82 \text{ V}$$

$$V_{28} = V_{23} = V_{48} = E - V_1 = 300 - 81,82 = 218,18 \text{ V}$$

$$Q_2 = Q_3 = C_{23} * V_{23} = 1,44*10^{-9} * 218,18 = 314,18 \text{ nC}$$

$$V_2 = \frac{Q_2}{C_2} = \frac{314,18*10^{-9}}{3,6*10^{-9}} = 87,27 \text{ V}$$

$$V_3 = \frac{Q_3}{C_3} = \frac{314,18*10^{-9}}{2,4*10^{-9}} = 130,91 \text{ V}$$

$$Q_4 = Q_5 = Q_6 = Q_7 = Q_8 = C_{48} * V_{48} = 1,56*10^{-9} * 218,18 = 340,36 \text{ nC}$$

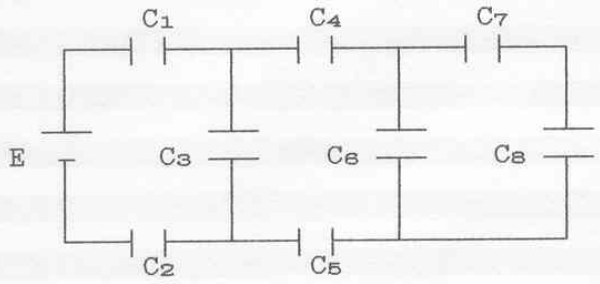
$$V_4 = V_5 = V_6 = V_7 = V_8 = \frac{V_{48}}{5} = \frac{218,18}{5} = 43,64 \text{ V}$$

2.18 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



$E = 100V$; $C_1 = 7\mu F$

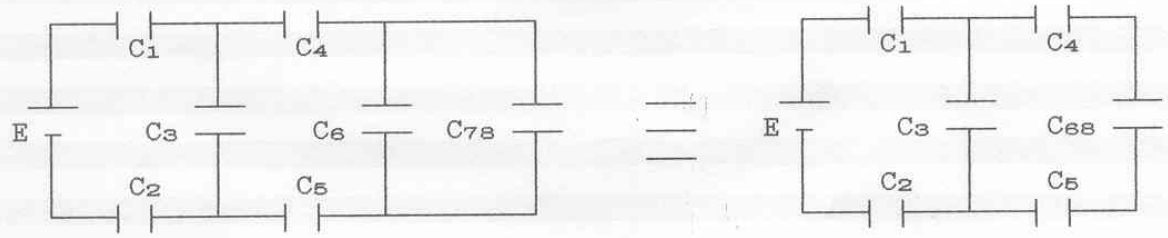
$C_2 = 8\mu F$; $C_3 = 6\mu F$

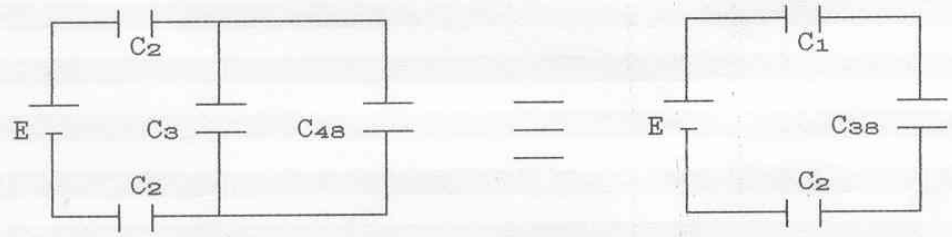
$C_4 = 4\mu F$; $C_5 = 5\mu F$

$C_6 = 3\mu F$; $C_7 = 2\mu F$

$C_8 = 1\mu F$

1.-





$$C_{78} = \frac{C_7 * C_8}{C_7 + C_8} = \frac{2*10^{-6} * 1*10^{-6}}{2*10^{-6} + 1*10^{-6}} = 0,67\ \mu F$$

$$C_{68} = C_6 + C_{78} = 3*10^{-6} + 0,67*10^{-6} = 3,67\ \mu F$$

$$C_{48} = \frac{1}{\frac{1}{C_4} + \frac{1}{C_{68}} + \frac{1}{C_5}} = \frac{1}{\frac{1}{4*10^{-6}} + \frac{1}{3,67*10^{-6}} + \frac{1}{5*10^{-6}}} = 1,384\ \mu F$$

$$C_{38} = C_3 + C_{48} = 6*10^{-6} + 1,384*10^{-6} = 7,384\ \mu F$$

$$C_T = \frac{1}{\frac{1}{C_1} + \frac{1}{C_{48}} + \frac{1}{C_2}} = \frac{1}{\frac{1}{7*10^{-6}} + \frac{1}{7,384*10^{-6}} + \frac{1}{8*10^{-6}}} = 2,48\ \mu F$$

2.-

$$Q_T = C_T * E = 2,48*10^{-6} * 100 = 248\ \mu C$$

3.-

$$Q_1 = Q_2 = Q_T = 248\ \mu C$$

$$V_1 = \frac{Q_1}{C_1} = \frac{248*10^{-6}}{7*10^{-6}} = 35,43\ V$$

$$V_2 = \frac{Q_2}{C_2} = \frac{248*10^{-6}}{8*10^{-6}} = 31\ V$$

$$V_3 = E - V_1 - V_2 = 100 - 35,43 - 31 = 33,57\ V$$

$$Q_3 = C_3 * V_3 = 6*10^{-6} * 33,57 = 201,42\ \mu C$$

$$Q_4 = Q_5 = Q_T - Q_3 = 248*10^{-6} - 201,42*10^{-6} = 46,58\ \mu C$$

$$V_4 = \frac{Q_4}{C_4} = \frac{46,58*10^{-6}}{4*10^{-6}} = 11,645\ V$$

$$V_5 = \frac{Q_5}{C_5} = \frac{46,58*10^{-6}}{5*10^{-6}} = 9,316\ V$$

$$V_6 = V_3 - V_4 - V_5 = 33,57 - 11,645 - 9,316 = 12,609\ V$$

$$Q_6 = C_6 * V_6 = 3*10^{-6} * 12,609 = 37,827\ \mu C$$

$$Q_7 = Q_8 = Q_4 - Q_6 = 46,58*10^{-6} - 37,827*10^{-6} = 8,753\ \mu C$$

$$V_7 = \frac{Q_7}{C_7} = \frac{8,753*10^{-6}}{2*10^{-6}} = 4,3765\ V$$

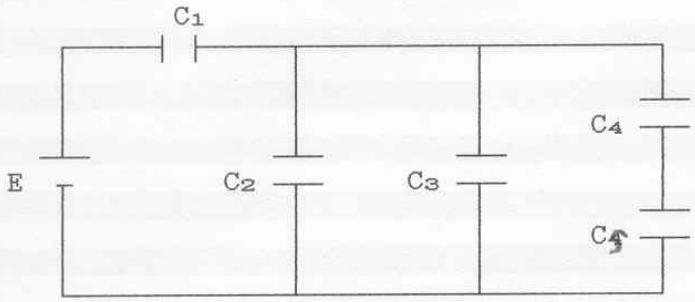
$$V_8 = \frac{Q_8}{C_8} = \frac{8,753*10^{-6}}{1*10^{-6}} = 8,753\ V$$

2.19 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.

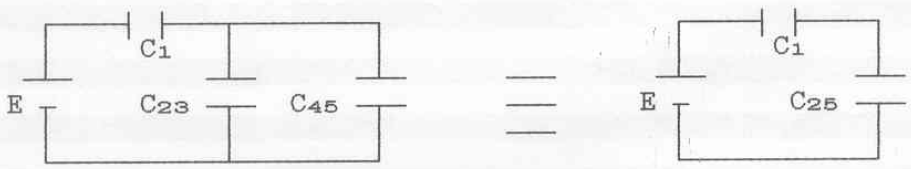


$E = 100\ V$; $C_1 = 120\ \mu F$

$C_2 = 30\ \mu F$; $C_3 = 50\ \mu F$

$C_4 = C_5 = 40\ \mu F$

1.-



$$C_{45} = \frac{C_4 * C_5}{C_4 + C_5} = \frac{C_4}{2} = \frac{40*10^{-6}}{2} = 20\ \mu F$$

$$C_{23} = C_2 + C_3 = 30*10^{-6} + 50*10^{-6} = 80\ \mu F$$

$$C_{25} = C_{23} + C_{45} = 80*10^{-6} + 20*10^{-6} = 100\ \mu F$$

$$C_T = \frac{C_1 * C_{25}}{C_1 + C_{25}} = \frac{120*10^{-6} * 100*10^{-6}}{120*10^{-6} + 100*10^{-6}} = 54{,}54\ \mu F$$

2.-

$$Q_T = C_T * E = 54{,}54*10^{-6} * 100 = 5454\ \mu C$$

3.-

$Q_1 = Q_{25} = Q_T = 5454\ \mu C$

$$V_1 = \frac{Q_1}{C_1} = \frac{5454*10^{-6}}{120*10^{-6}} = 45,45\ V$$

$V_2 = V_3 = V_{45} = E - V_1 = 100 - 45,45 = 54,55\ V$

$Q_2 = C_2 * V_2 = 30*10^{-6} * 54,55 = 1636,5\ \mu C$

$Q_3 = C_3 * V_3 = 50*10^{-6} * 54,55 = 2727,5\ \mu C$

$Q_4 = Q_5 = Q_{45} = C_{45} * V_{45} = 20*10^{-6} * 54,55 = 1091\ \mu C$

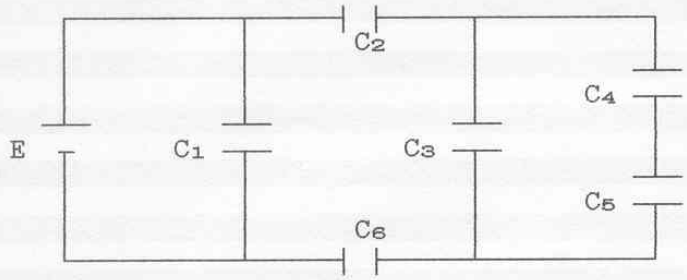
$$V_4 = V_5 = \frac{Q_4}{C_4} = \frac{1091*10^{-6}}{40*10^{-6}} = 27,275\ V$$

2.20 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



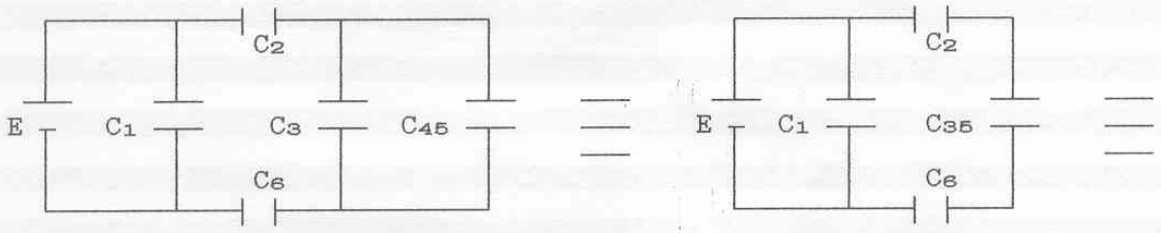
E = 100 V ; C_1 = 20 μF

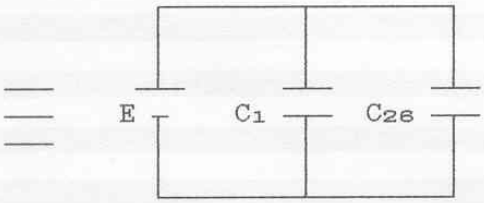
C_2 = 30 μF ; C_3 = 22 μF

C_4 = 180 μF ; C_5 = 20 μF

C_6 = 10 μF

1.-





$$C_{45} = \frac{C_4 * C_5}{C_4 + C_5} = \frac{180*10^{-6} * 20*10^{-6}}{180*10^{-6} + 20*10^{-6}} = 18\ \mu F$$

$$C_{35} = C_3 + C_{45} = 22*10^{-6} + 18*10^{-6} = 40\ \mu F$$

$$C_{26} = \frac{1}{\frac{1}{C_2} + \frac{1}{C_{35}} + \frac{1}{C_6}} = \frac{1}{\frac{1}{30*10^{-6}} + \frac{1}{40*10^{-6}} + \frac{1}{10*10^{-6}}} = 6{,}32\ \mu F$$

$$C_T = C_1 + C_{26} = 20*10^{-6} + 6{,}32*10^{-6} = 26{,}32\ \mu F$$

2.-

$$Q_T = C_T * E = 26,32*10^{-6} * 100 = 2632\ \mu C$$

3.-

$$V_1 = E = 100\ V$$

$$Q_1 = C_1 * V_1 = 20*10^{-6} * 100 = 2000\ \mu C$$

$$Q_2 = Q_6 = Q_{35} = Q_T - Q_1 = 2636*10^{-6} - 2000*10^{-6} = 632\ \mu C$$

$$V_2 = \frac{Q_2}{C_2} = \frac{632*10^{-6}}{30*10^{-6}} = 21\ V$$

$$V_6 = \frac{Q_6}{C_6} = \frac{632*10^{-6}}{10*10^{-6}} = 63,2\ V$$

$$V_3 = V_{45} = V_{35} = \frac{Q_{35}}{C_{35}} = \frac{632*10^{-6}}{40*10^{-6}} = 15,8\ V$$

$$Q_3 = C_3 * V_3 = 22*10^{-6} * 15,8 = 347,6\ \mu C$$

$$Q_4 = Q_5 = Q_{45} = C_{45} * V_{45} = 18*10^{-6} * 15,8 = 284,4\ \mu C$$

$$V_4 = \frac{Q_4}{C_4} = \frac{284,4*10^{-6}}{180*10^{-6}} = 1,58\ V$$

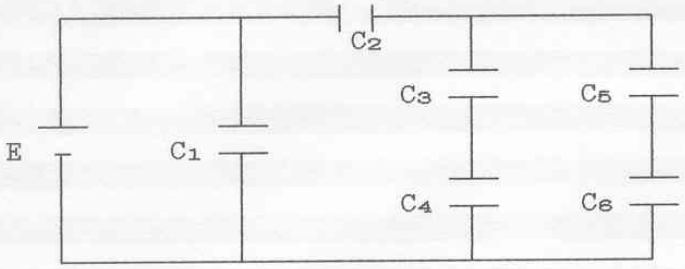
$$V_5 = \frac{Q_5}{C_5} = \frac{284,4*10^{-6}}{20*10^{-6}} = 14,22\ V$$

2.21 - Del circuito di figura determinare:

1.- la capacità totale;

2.- la carica complessivamente erogata dal generatore;

3.- la carica e la differenza di potenziale su ogni capacità.



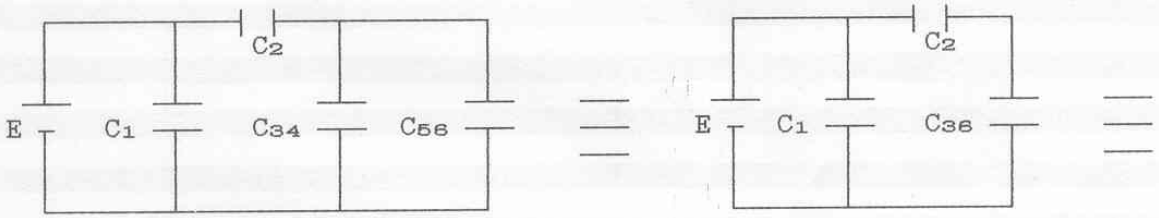
E = 100 V ; C_1 = 12 μF

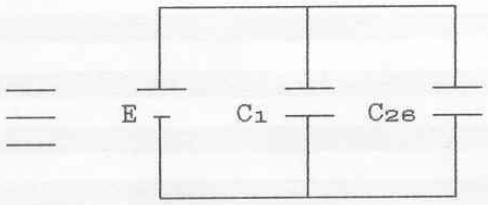
C_2 = 30 μF ; C_3 = 180 μF

C_4 = 20 μF ; C_5 = 60 μF

C_6 = 60 μF

1.-





$$C_{56} = \frac{C_5 * C_6}{C_5 + C_6} = \frac{C_5}{2} = \frac{60*10^{-6}}{2} = 30\ \mu F$$

$$C_{34} = \frac{C_3 * C_4}{C_3 + C_4} = \frac{180*10^{-6} * 20*10^{-6}}{180*10^{-6} + 20*10^{-6}} = 18\ \mu F$$

$$C_{36} = C_{34} + C_{56} = 18*10^{-6} + 30*10^{-6} = 48\ \mu F$$

$$C_{26} = \frac{C_2 * C_{36}}{C_2 + C_{36}} = \frac{30*10^{-6} * 48*10^{-6}}{30*10^{-6} + 48*10^{-6}} = 18{,}46\ \mu F$$

$$C_T = C_1 + C_{26} = 12*10^{-6} + 18,46*10^{-6} = 30,46\ \mu F$$

2.-

$$Q_T = C_T * E = 30,46*10^{-6} * 100 = 3046\ \mu C$$

3.-

$$V_1 = E = 100\ V$$

$$Q_1 = C_1 * V_1 = 12*10^{-6} * 100 = 1200\ \mu C$$

$$Q_2 = Q_{36} = Q_T - Q_1 = 3046*10^{-6} - 1200*10^{-6} = 1846\ \mu C$$

$$V_2 = \frac{Q_2}{C_2} = \frac{1846*10^{-6}}{30*10^{-6}} = 61,54\ V$$

$$V_{36} = V_{34} = V_{56} = E - V_1 = 100 - 61,53 = 38,47\ V$$

$$Q_3 = Q_4 = Q_{34} = C_{34} * V_{34} = 18*10^{-6} * 38,47 = 692,46\ \mu C$$

$$V_3 = \frac{Q_3}{C_3} = \frac{692,46*10^{-6}}{180*10^{-6}} = 3,85\ V$$

$$V_4 = \frac{Q_4}{C_4} = \frac{692,46*10^{-6}}{20*10^{-6}} = 34,62\ V$$

$$Q_5 = Q_6 = Q_{56} = C_{56} * V_{56} = 30*10^{-6} * 38,47 = 1154\ \mu C$$

$$V_5 = V_6 = \frac{Q_5}{C_5} = \frac{1154*10^{-6}}{60*10^{-6}} = 19,23\ V$$