NAME: RIFAH SANZIDA

ID: 22-47154-1

Name: Rifat Samida
ID: 22-47154-1

Ans to the Quen NO. 1

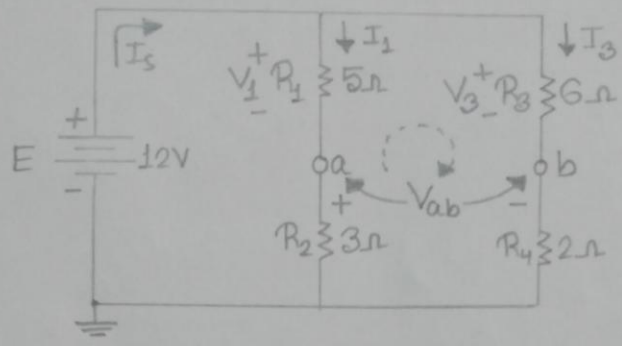

FIG. 7.21

$$V_1 = \frac{R_1 E}{R_1 + R_2} = \frac{(5\Omega)(12V)}{5\Omega + 3\Omega} = \frac{60V}{8} = 7.5V$$

$$V_3 = \frac{R_3 E}{R_3 + R_4} = \frac{(6\Omega)(12V)}{6\Omega + 2\Omega} = \frac{72V}{8} = 9V$$

$$+V_1 - V_3 + V_{ab} = 0$$

$$\therefore V_{ab} = V_3 - V_1 = 9V - 7.5V = 1.5V$$

Answer. 1.5V

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Ans to the Ques NO.2

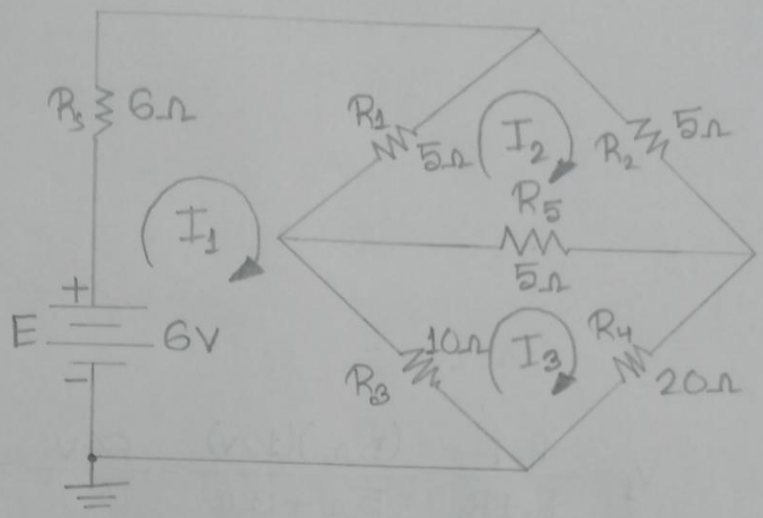

Fig.2.1

Loop 1

$$(6+5+10)I_1 - 5I_2 - 10I_3 = 6$$

$$\Rightarrow 21I_1 - 5I_2 - 10I_3 = 6$$

Loop 2

$$(5+5+5)I_2 - 5I_1 - 5I_3 = 0$$

$$\Rightarrow 15I_2 - 5I_1 - 5I_3 = 0$$

Loop 3

$$(10+5+20)I_3 - 10I_1 - 5I_2 = 0$$

$$\Rightarrow 35I_3 - 10I_1 - 5I_2 = 0$$

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$21I_1 - 5I_2 - 10I_3 = 6$

$-5I_1 + 15I_2 - 5I_3 = 0$

$-10I_1 - 5I_2 + 35I_3 = 0$

Using calculator,

$I_1 = 0.3935A$

$I_2 = 0.1771A$

$I_3 = 0.1377A$

$\therefore I_{R_5} = I_2 - I_3 = (0.1771 - 0.1377)A$

$= 0.0394A$

Answer. 0.0394A

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Ans to the Quen NO.3

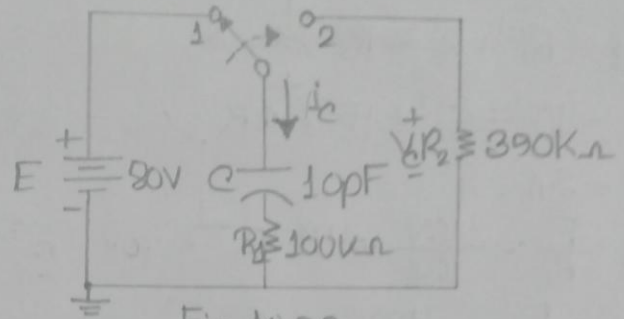

Fig. 10.92

'a'

We have, $R_1 = 100K\Omega$, $E = 80V$, $C = 10pF$

We know,

$$\tau = R_1C = (100K\Omega)(10pF) = 10^{-6}s$$

$$V_c = 80V(1 - e^{-t/10^{-6}s}) \quad [\because V_c = E(1 - e^{-t/\tau})]$$

$$i_c = \frac{80V}{100K\Omega} e^{-t/10^{-6}s} = 0.8\,mA\, e^{-t/10^{-6}s} \quad [\because i_c = \frac{E}{R} e^{-t/\tau}]$$

(Ans)

'b'

$$R' = R_1 + R_2 = (100 + 390)K\Omega = 490K\Omega$$

$$\tau' = R'C = (490K\Omega)(10pF) = 4.9 \times 10^{-6}s$$

$$V_c = E(1 - e^{-t/\tau}) = 80V\, e^{-t/(4.9\times10^{-6})s}$$

$$i_c = \frac{E}{R} e^{-t/\tau} = \frac{80V}{490K\Omega} e^{-t/(4.9\times10^{-6})s}$$

$$= 0.16\,mA\, e^{-t/(4.9\times10^{-6})s}$$

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Ans to the Ques NO.4

$R_{Th} = (R_1^{-1} + R_2^{-1} + R_3^{-1})^{-1}$

$= (10^{-1} + 6^{-1} + 15^{-1})^{-1} \Omega$

$= 3\Omega$

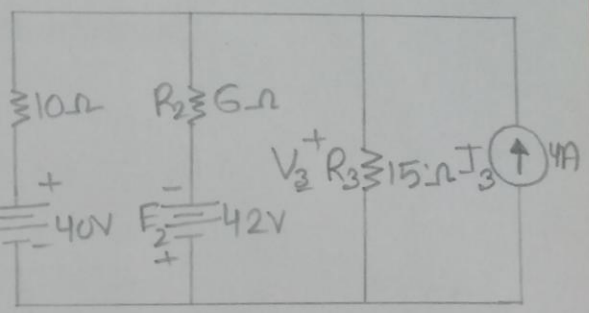


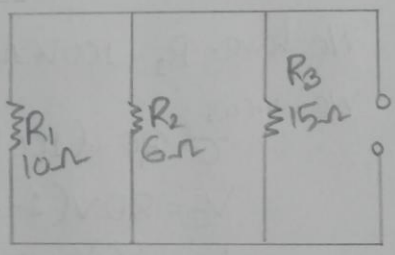
Fig. 4.1

$I_1 = \frac{E}{R_1} = \frac{40V}{10\Omega} = 4A$

$I_2 = \frac{E_2}{R_2} = \frac{42V}{6\Omega} = 7A$

Nodal Analysis,

$\left(\frac{1}{10} + \frac{1}{6} + \frac{1}{15}\right) V = 4 - 7 + 4$



$\Rightarrow 0.34V = 1$

$\Rightarrow V = \frac{1}{0.34} = 2.94V$

So, circuit is in parallel, voltage are all same as R_3.

$\therefore E_{Th} = 2.94V$

The Thevenin's Equivalent circuit,