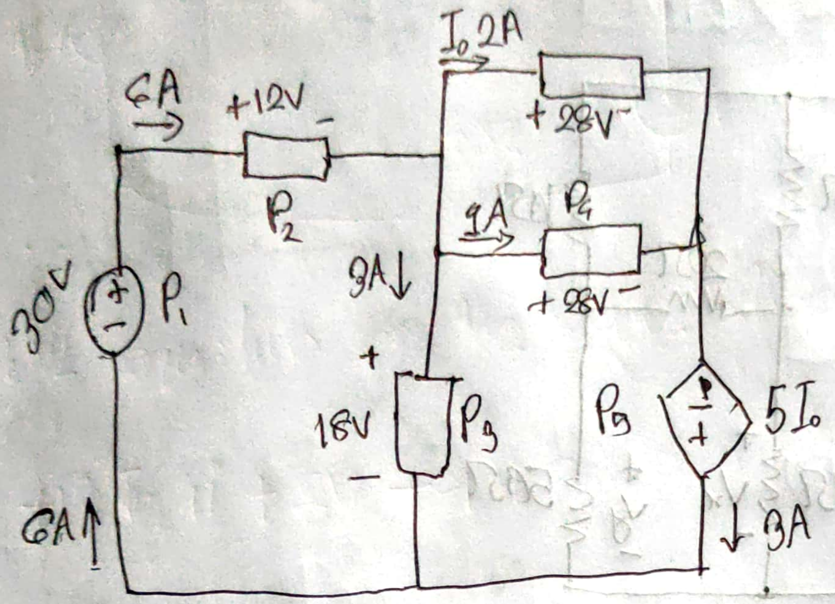
Omar Rafat Adnan

Id: 2020-2-60-037

Answer to the question number 1



$P_1 = -vi = -(30 \times 6) = -180$ watt (S)

$P_2 = +vi = (6 \times 12) = 72$ watt (A)

$P_3 = +vi = (18 \times 3) = 54$ watt (A)

$P_4 = +vi = (1 \times 28) = 28$ watt (A)

$P_5 = -vi = -(5I_0 \times 3) = -15I_0$ (S)

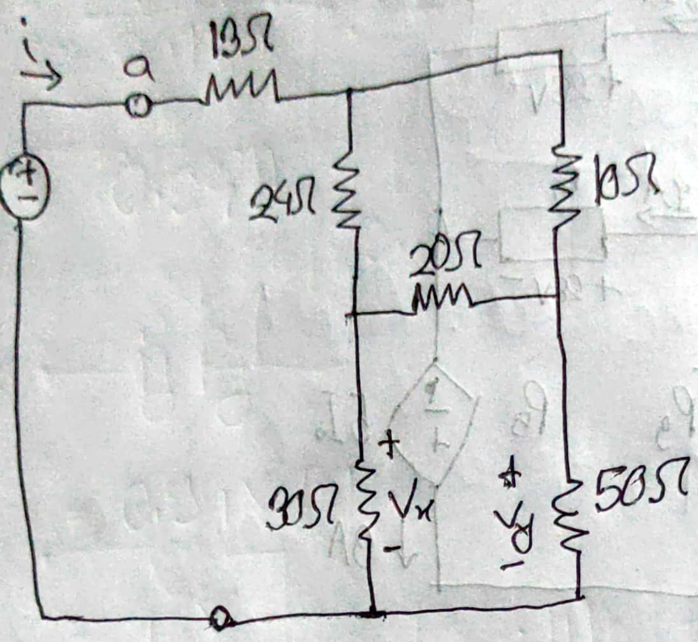
$= -(15 \times 2)$

$= -30$ watt (S)

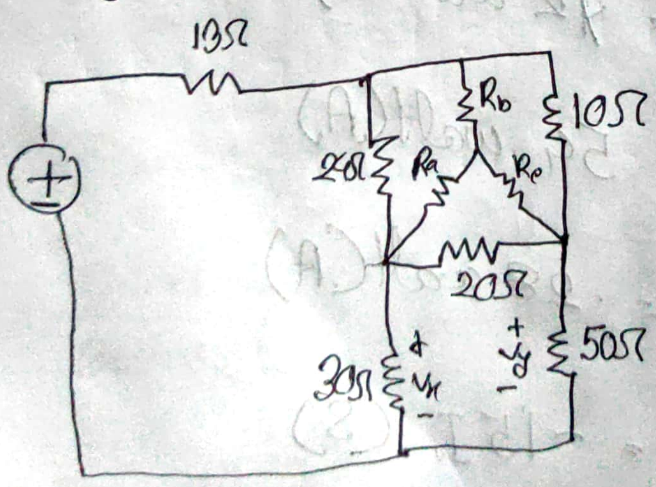
Scanned with CamScanner

Answer to the question NO:04

(b)



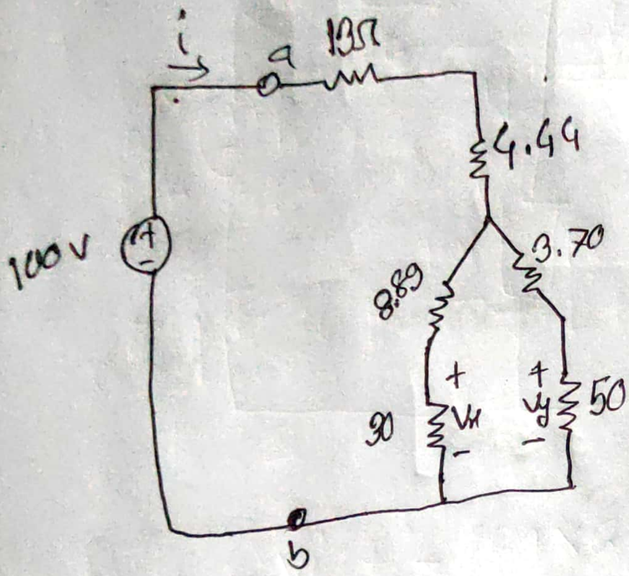
Applying Why - della transformation.

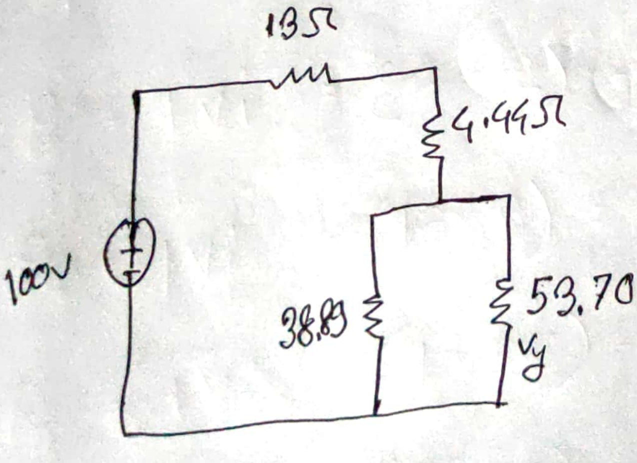


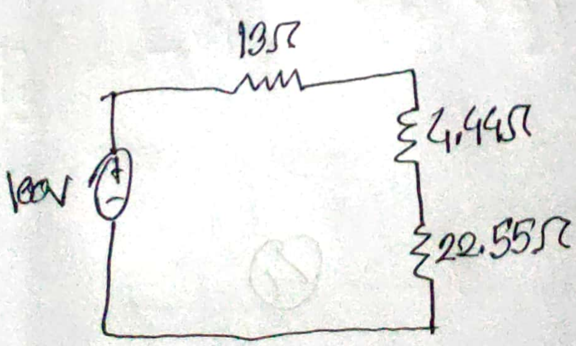
$$R_a = \frac{24 \times 20}{24 + 20 + 10} = 8.89\Omega$$

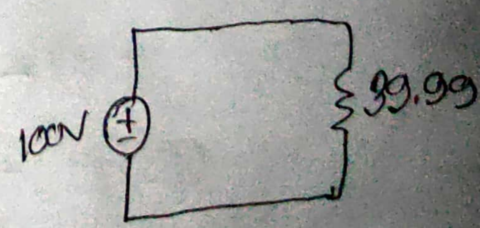
$$R_b = \frac{24 \times 10}{24+20+10} = 4.44\,\Omega$$

$$R_c = \frac{20 \times 10}{24+20+10} = 3.70\,\Omega$$









$$i = \frac{100}{39.99} = 2.50A$$

$$i_y = \frac{30}{30+50} \times 2.50$$

$$= 0.94A$$

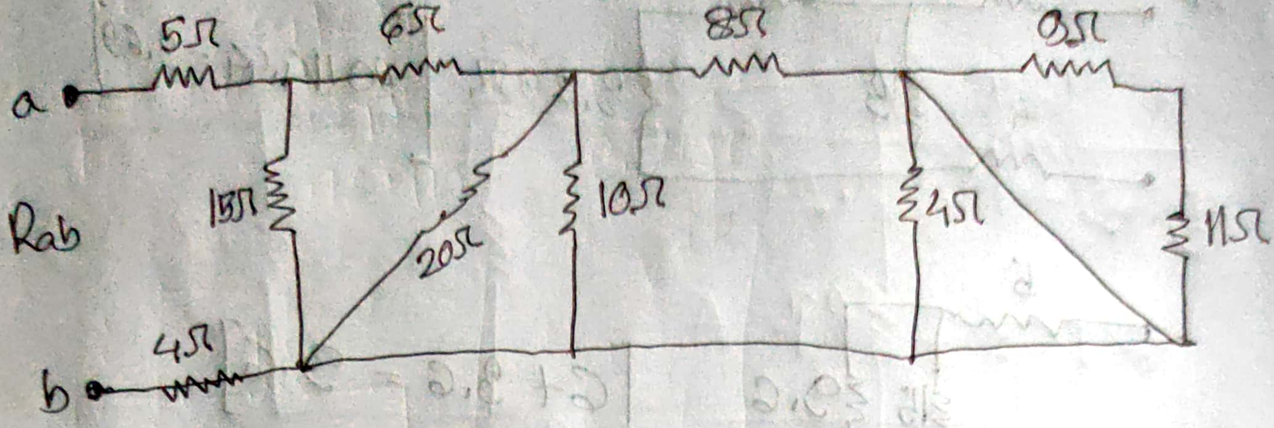
$$V_y = i_y R_y$$

$$= 0.94 \times 50$$

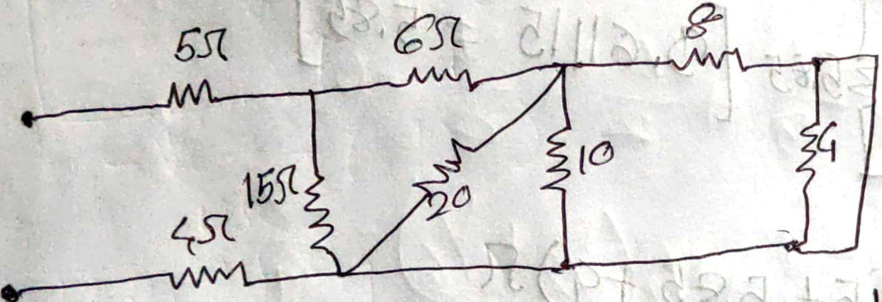
$$= 47V$$

$$\therefore i = 2.50A, \; V_y = 47V$$

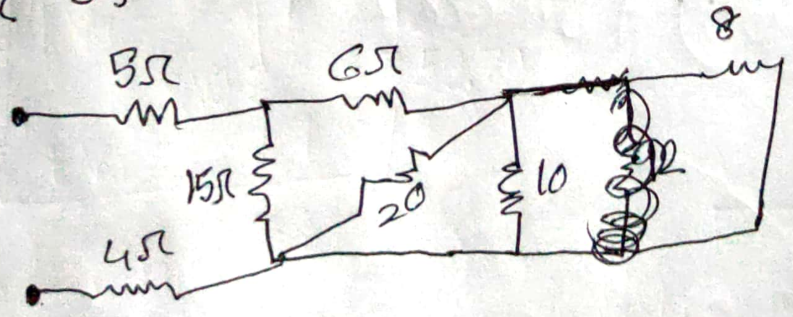
Answer to the question No: 03

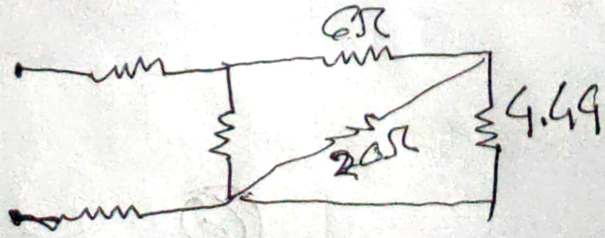


Here 9Ω and 11Ω are connected in series and they are connected with a short circuit.

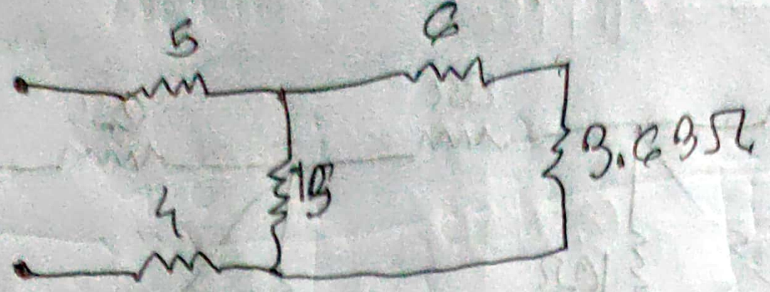


4Ω is connected with a short circuit

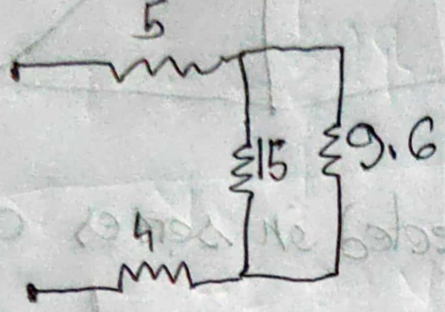




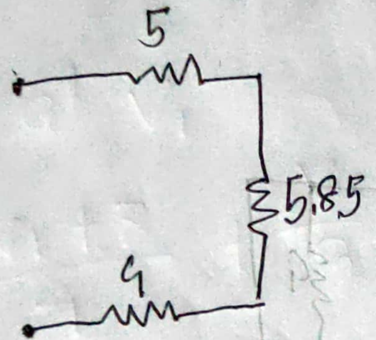
[8 || 10 = 4.49]



$[20 \| 4.44 = 3.63]$



$[6 + 3.6 = 9.6]$

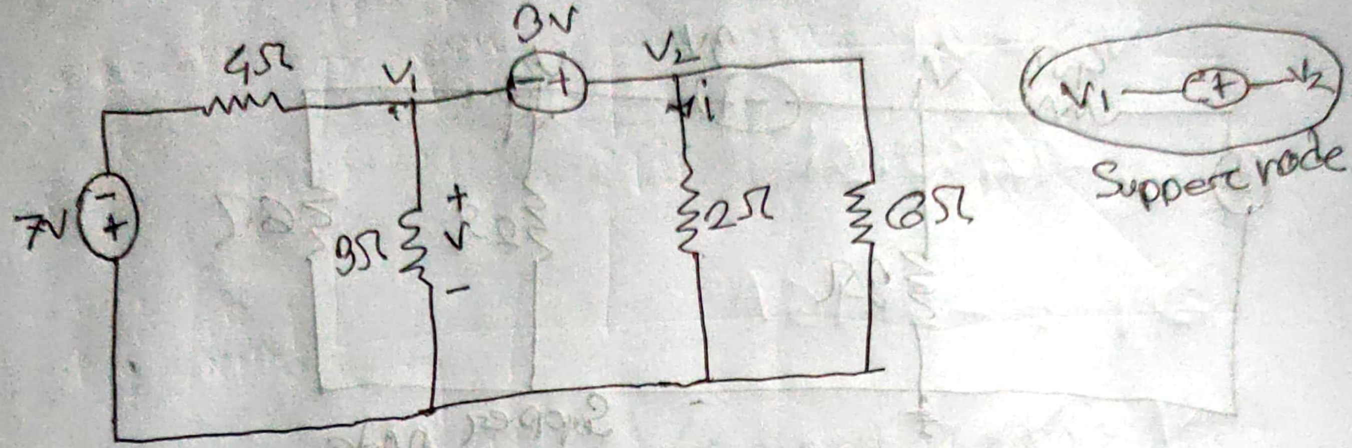


$[9.6 \| 15 = 5.85]$

$\therefore R_{ab} = (5 + 5.85 + 4)\Omega$

$= 14.85\Omega$

Answer to the question number (5)



apply Nodel analysis at V_1

$$\frac{V_1+7}{4}+\frac{V_1}{3}+\frac{V_2}{2}+\frac{V_2}{6}=0$$

$$V_1\left[\frac{1}{4}+\frac{1}{3}\right]+V_2\left[\frac{1}{2}+\frac{1}{6}\right]=\frac{-7}{4}$$

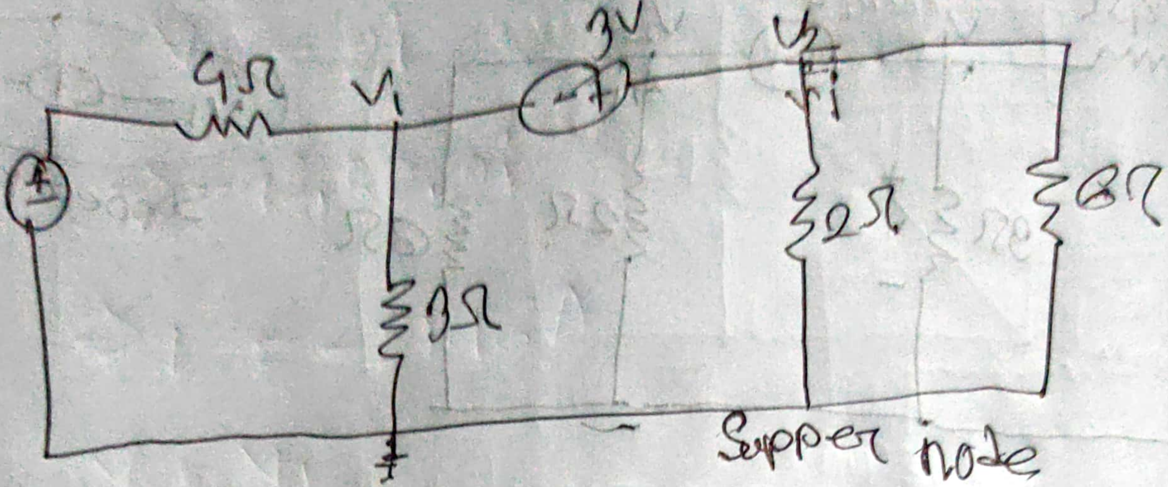
$$V_1[0.5833]+0.666V_2=-1.75 \quad - \; ①$$

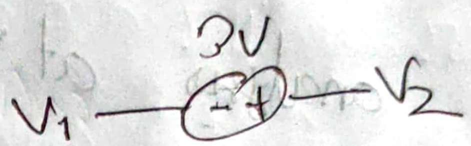
$$D=\begin{vmatrix}0.5833 & 0.666\\ 1 & -1\end{vmatrix}$$

$$=-0.5833-0.666$$

$$D=-1.2493$$

Answer to the question number 5





KCL at V_1

$$\frac{V_1+7}{4}+\frac{V_1}{3}+\frac{V_2}{2}+\frac{V_2}{6}=0$$

$$\Rightarrow V_1\left[\frac{1}{4}+\frac{1}{3}\right]+V_2\left(\frac{1}{2}+\frac{1}{6}\right)=\frac{-7}{4}$$

$$\Rightarrow V_1(0.5833)+0.666V_2=-1.75 \quad (1)$$

KCL at V_2

$$V_1-V_2=-3 \quad (2)$$

By Cramer's rule!

$$V_1 = \frac{\begin{vmatrix} -1.75 & 0.666 \\ -3 & -1 \end{vmatrix}}{\begin{vmatrix} 0.5833 & 0.666 \\ 1 & -1 \end{vmatrix}}$$

$= (1.75 - 1.998) / (-0.5833 + 0.666)$

$= -2.99V$

$$V_2 = \frac{\begin{vmatrix} 0.5833 & -1.75 \\ 1 & -3 \end{vmatrix}}{\begin{vmatrix} 0.5833 & 0.666 \\ 1 & -1 \end{vmatrix}}$$

$$= \frac{-1.7499 - 1.75}{-0.5833 + 0.666}$$

$= -42.32V$

Here,

$V_2 = 2i$

$\Rightarrow -42.32 = 2i$

$\Rightarrow i = -21.16A$

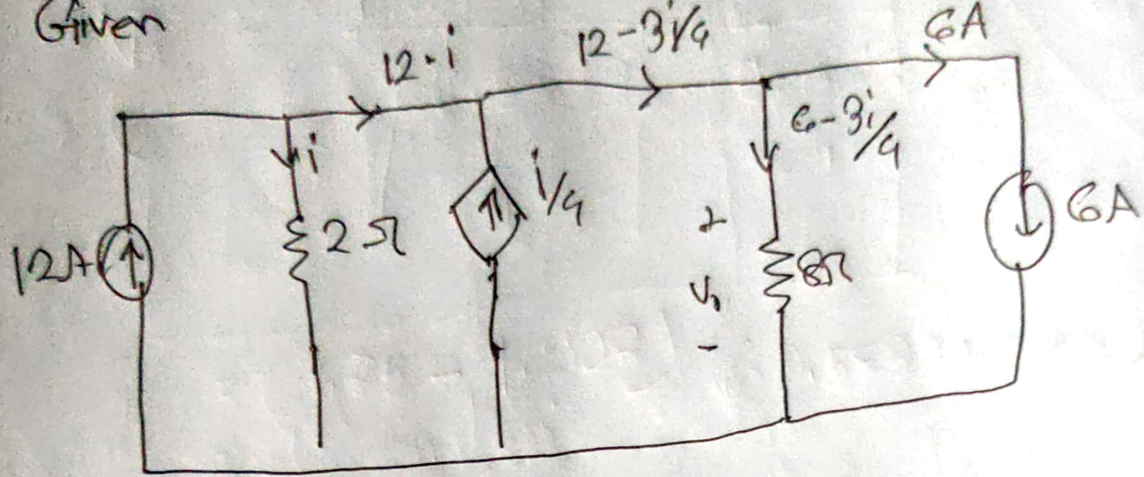
$V = V_1$

$= -2.99 V$

Ans

Answer to the question No: 02

Given



from loop ① we can write as

$$2i - 8\left(6 - \frac{3i}{4}\right) = 0$$

$$2i - 48 + 6i = 0$$

$$i = 6 \text{ Amp}$$

$$V_o = \left(6 - 3i/4\right) \times 8$$

$$= \left(6 - \frac{3 \times 6}{4}\right) \times 8$$

$$= 12 \text{ Volt}$$

Ans