CSE 250

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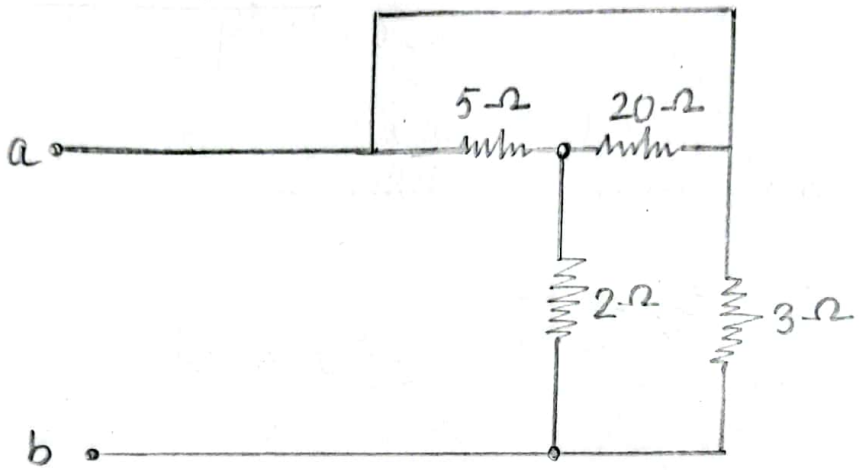
ID :- 2230168 9

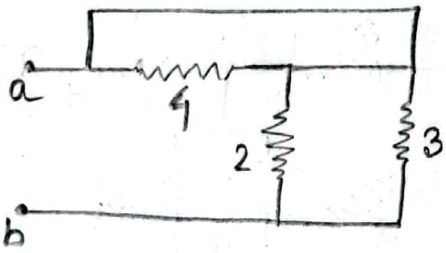
Section :- 28

Date of submission :- 13.10.2023

Assignment ~ 01

Answer to the Question NO - 01





Here,

$20 \| 5 = \frac{1}{20} + \frac{1}{5}$

$= \frac{1}{4}$

$\therefore 20 \| 5 = 4$ (parallel)

Here,

$R_1 = 5\,\Omega$

$R_2 = 20\,\Omega$

$R_3 = 2\,\Omega$

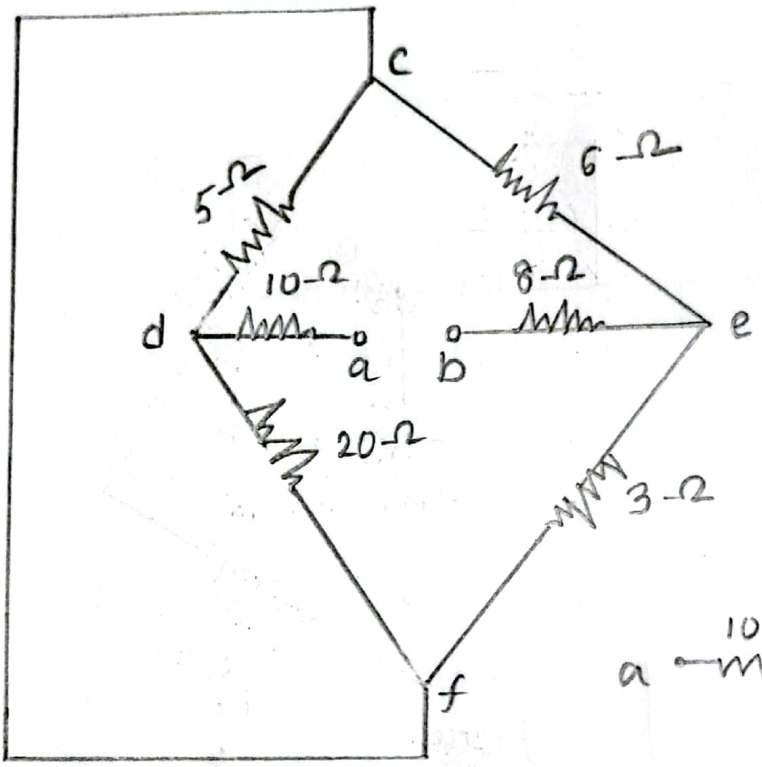
$R_4 = 3\,\Omega$

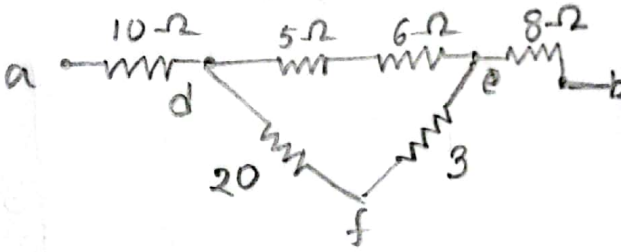
Now, $4\,\Omega + 2\,\Omega = 6\,\Omega$ (series)

$\therefore \frac{1}{R_{ab}} = \frac{1}{3} + \frac{1}{6}\,\Omega$

$\Rightarrow R_{ab} = 2\,\Omega$ (Ans:)

Answer to the Question NO - 02





Here,

$5\ \Omega \parallel 20\ \Omega = 4\ \Omega$

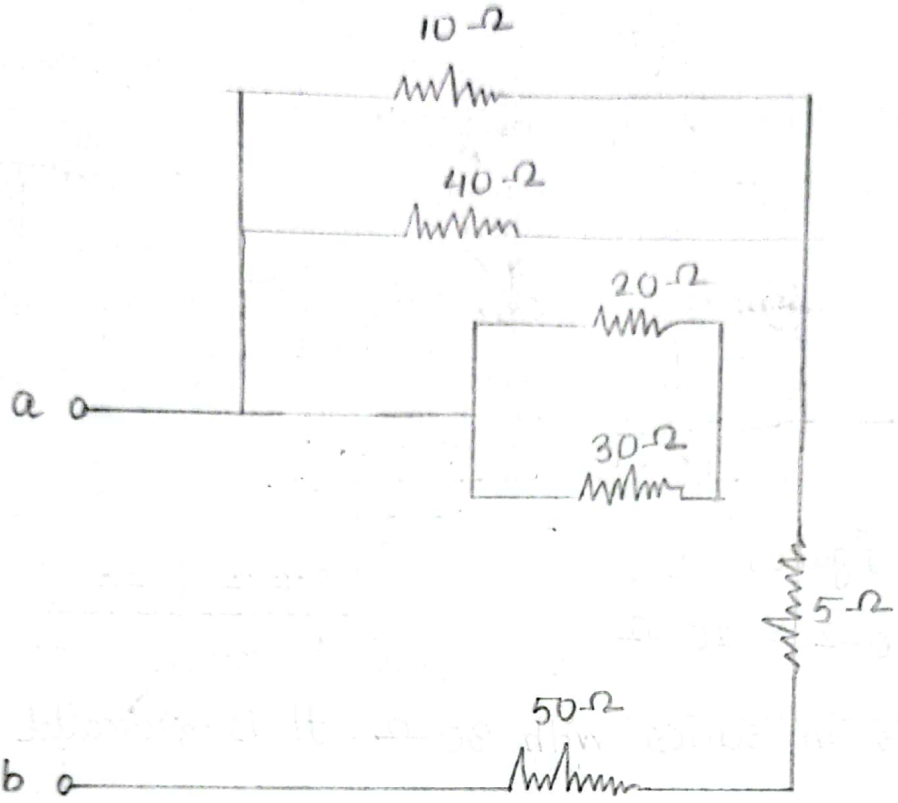
$6\ \Omega \parallel 3\ \Omega = 2\ \Omega$

c and f point are at same,

$\therefore$ in series it will make $= 10 + 4 + 2 + 8 = 24\ \Omega$

$\therefore R_{ab} = 24\ \Omega$ (Ans:)

Answer to the Question NO- 03 (a)



10 Ω and 40 Ω are in parallel

$\therefore \quad 10 \,||\, 40 = \frac{1}{10} + \frac{1}{40}$

$\Rightarrow 10 \,||\, 40 = 8$

Again,

$20 \,||\, 30 = 12$

And,

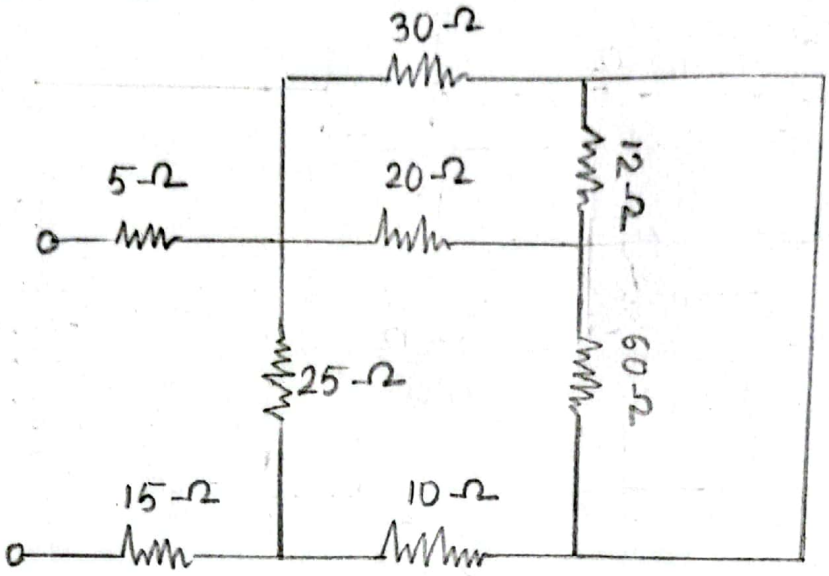
$8 \,||\, 12 = 4{\cdot}8$

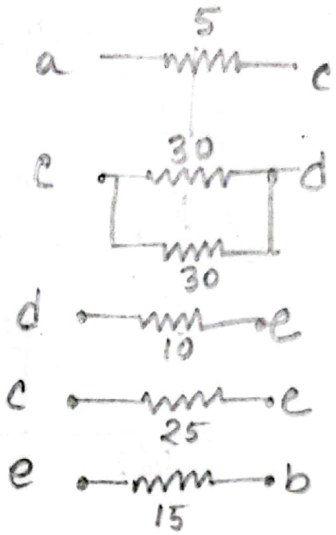
$\therefore R_{ab} = 5 + 50 + 4{\cdot}8$

$= 59{\cdot}8\ \Omega$

(Ans:-)

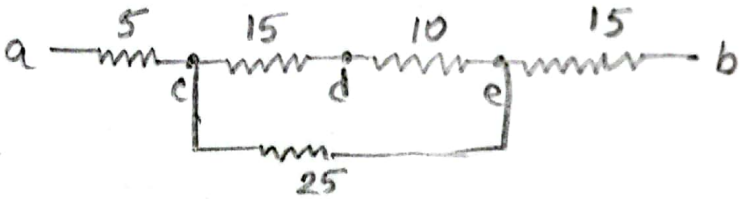
Answer to the Question NO - 3(b)





In this given figure,

$12\,\Omega \,||\, 60\,\Omega = 10\,\Omega$



and $20\,\Omega$ is in series with $30\,\Omega$. It is parallel with $30\,\Omega$.

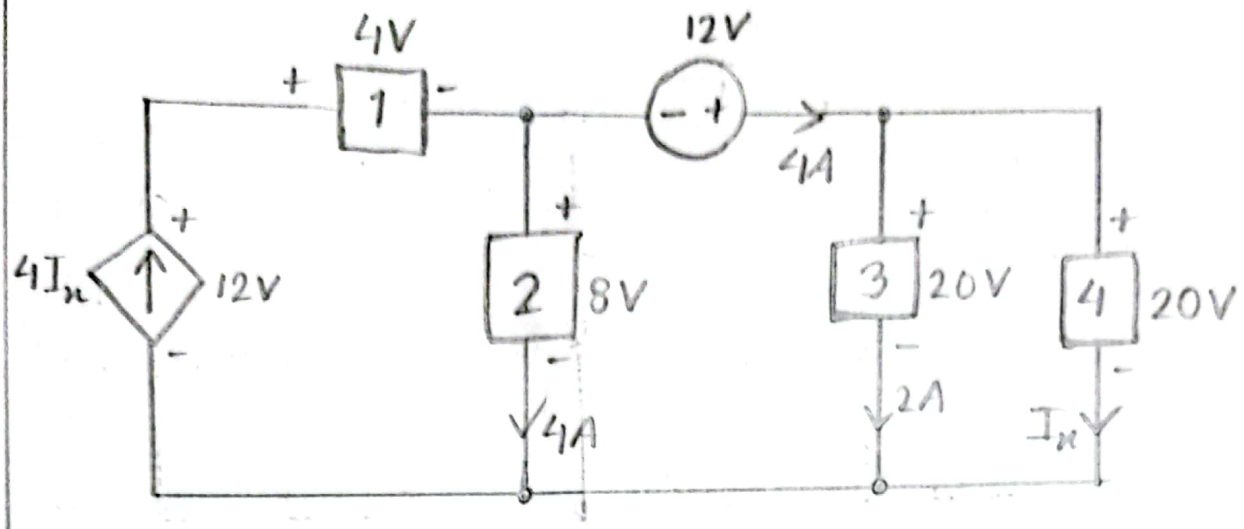
$\therefore 30 \,||\, 30 = 15\,\Omega$

and $25 \,||\, (15+10) = 12.5\,\Omega$

$\therefore R = 5 + 12.5 + 15\,\Omega$

$= 32.5\,\Omega$ (Ans:)

Answer to the Question NO. - 04



We know,

$P = VI$

$P_1 = 4 \times 4I_x = 4 \times 4 \times I_x = 4 \times 8$
$= 32\Omega$

$P_2 = 8 \times 4$
$= 32\,W$

$P = -12 \times 4$
$= -48\,W$

$P_3 = 20 \times 2$
$= 40\,W$

$P_4 = 20 \times I_x = 40\,(W)$

$\therefore I_x = 2\,A$ (Ans:)

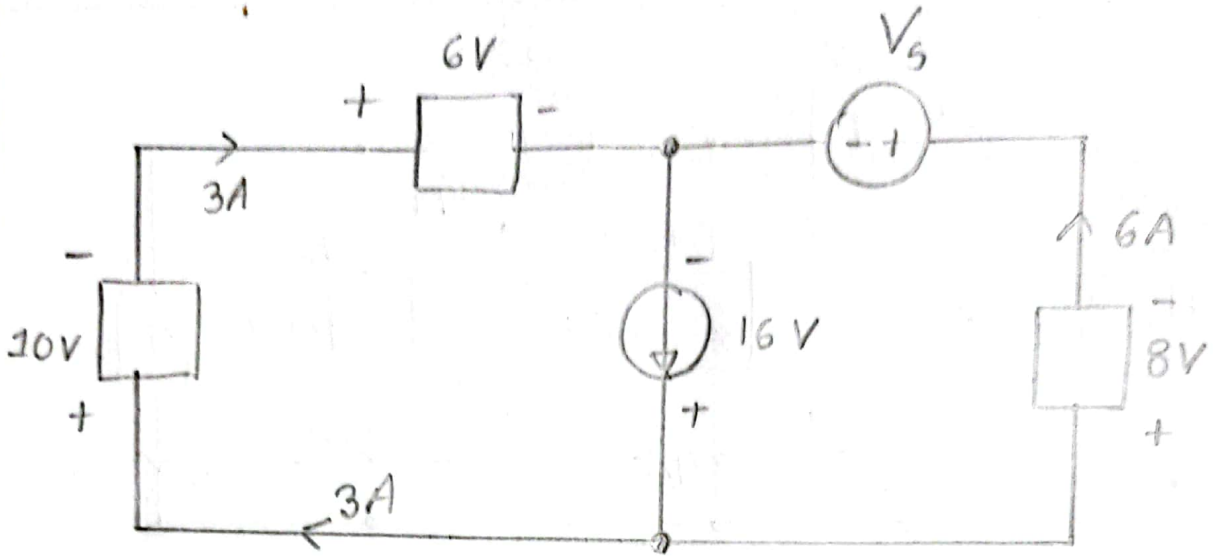
$V = IR$
$\Rightarrow R = \frac{V}{I}$

$P_4 = 20 \times I_x$

$\Rightarrow 40 = 20 \times I_x$

$\therefore I_x = 2\,A$

Answer to the Question NO - 05



For the given circuit,

$P_{10V} = 10 \times 3 = 30W$

$P_{6V} = 6 \times 3 = 18\ W$

$P_{9A} = 16 \times -9 = -144W$

$P_{V_S} = V_S \times 6 = 6V_S W$

$P_{8V} = (8) \times 6 = 48\ W$

For this, one source supplies power (the element with the negative power value), and the power absorbed by the other elements must equal each other.

$\therefore -144 + 30 + 18 + 6V_S + 48 = 0$

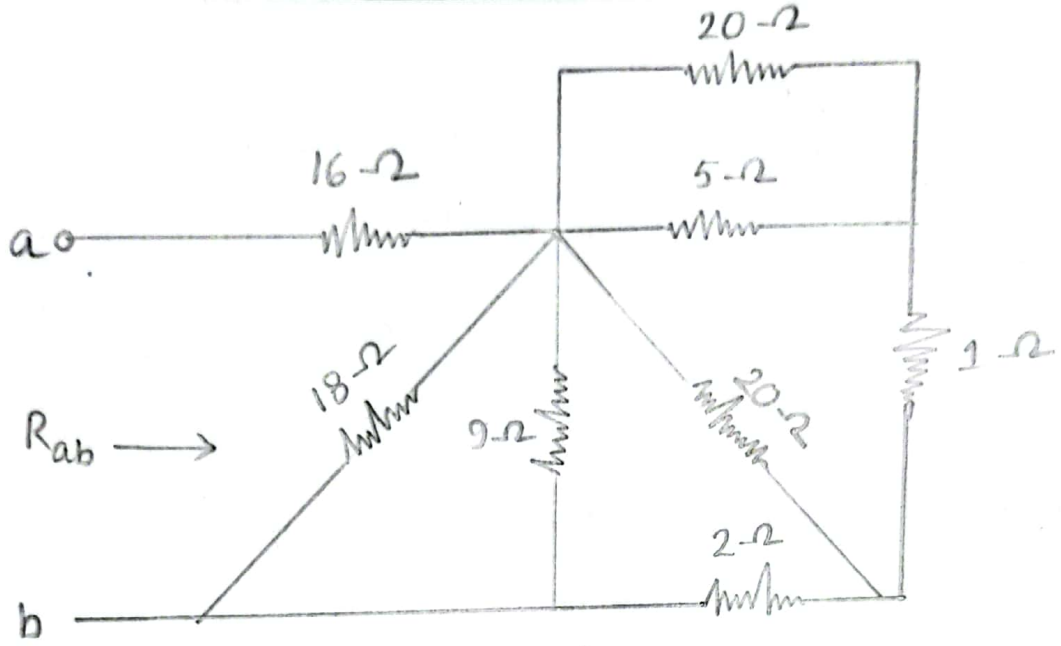
$\Rightarrow 6\ V_S = 48$

$\Rightarrow V_S = 8\ V$

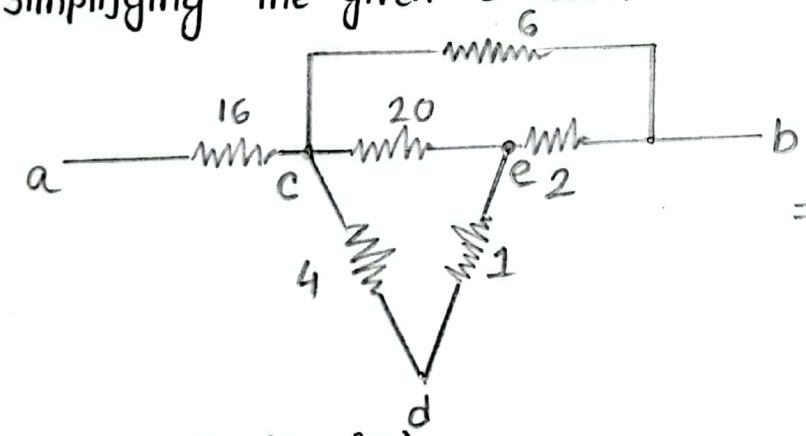
$\therefore P_{V_S} = 8 \times 6 = 48\ W$

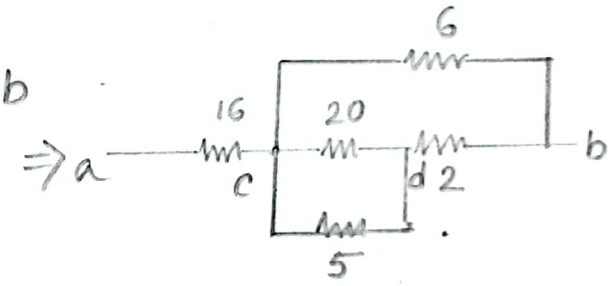
(Ans:)

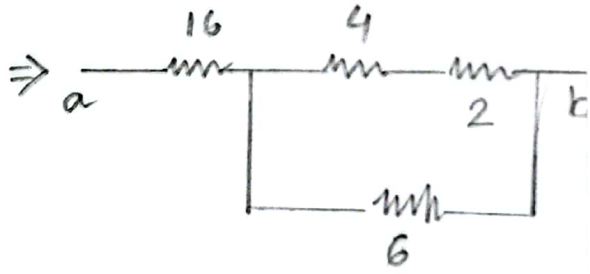
Answer to the Question NO - 06



simplifying the given circuit,







$4+1 = 5\,\Omega$ (series)

$20 \| 5 = 4\,\Omega$ (parallel)

$\therefore R_{ab} = 16 + \{(4+2) \| 6\}$

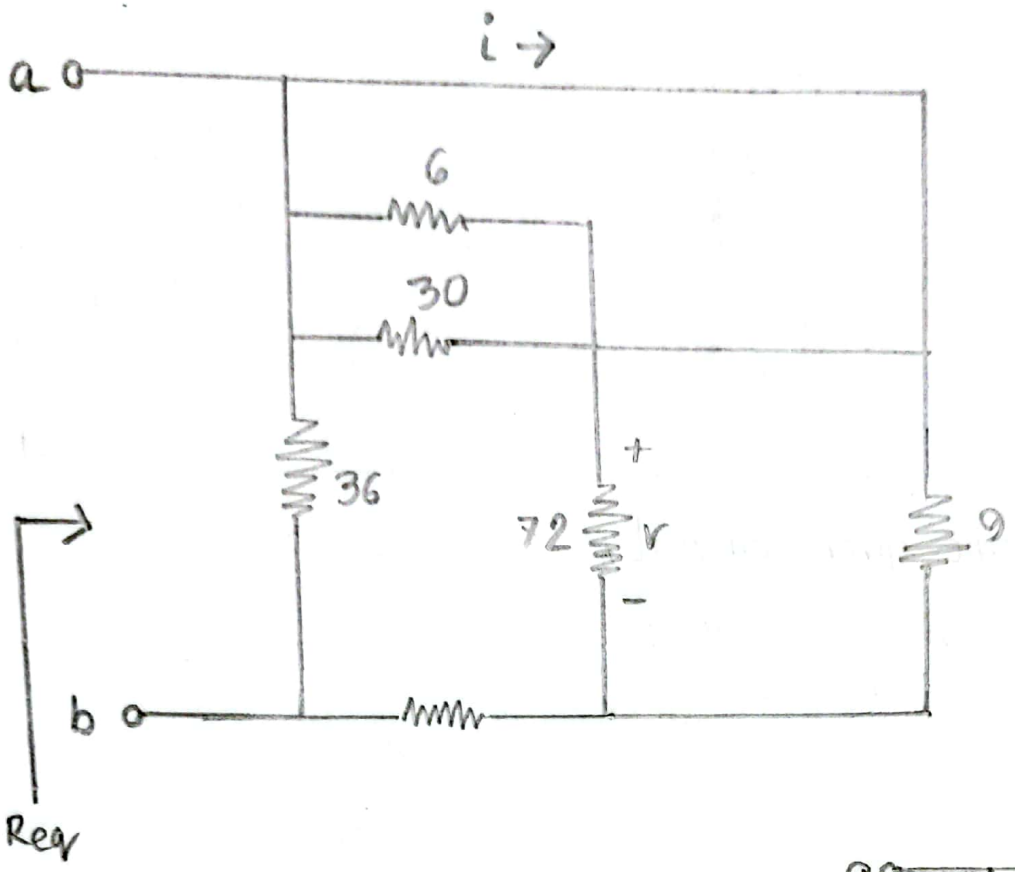
$= 16 + 3$

$= 19\,\Omega$

$\therefore R_{ab} = 19\,\Omega$

(Ans:)

Answer to the Question NO - 07



6 Ω and 30 Ω are in parallel.

$\therefore 6 \parallel 30 = \frac{1}{6} + \frac{1}{30}$

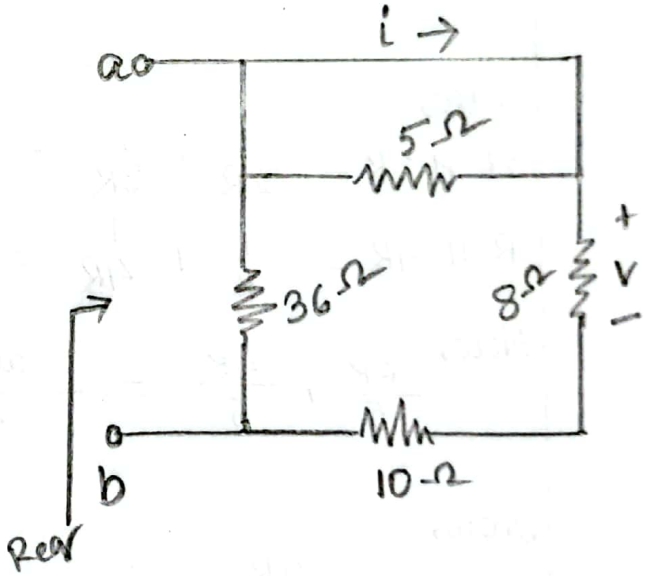
$\therefore 6 \parallel 30 = 5$

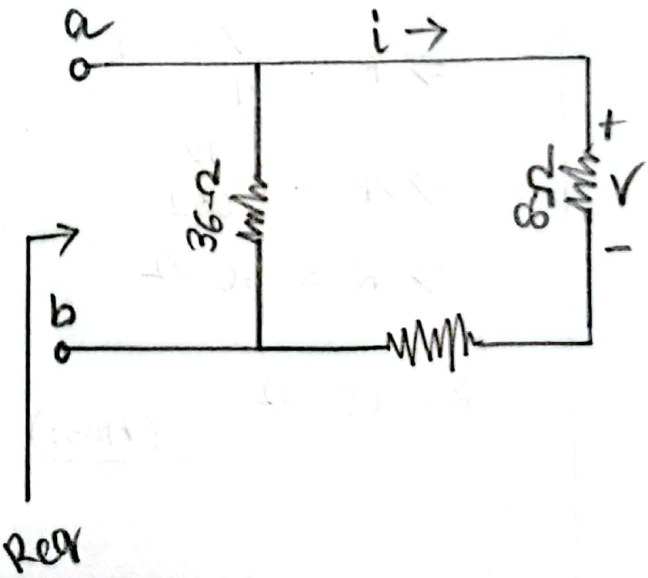
Again, 72 Ω and 9 Ω are in parallel.

$\therefore 72 \parallel 9 = 8\ \Omega$

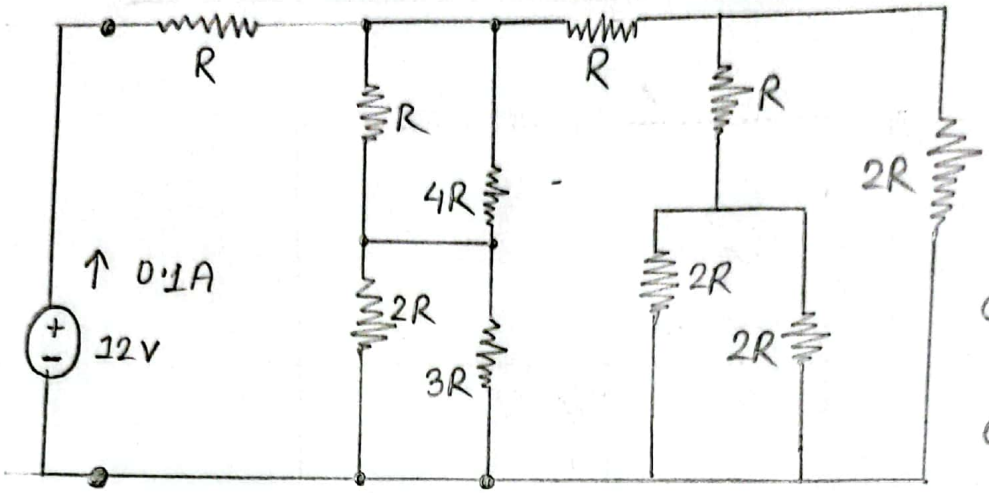
$\therefore R_{eq} = 36 \parallel (8+10)$

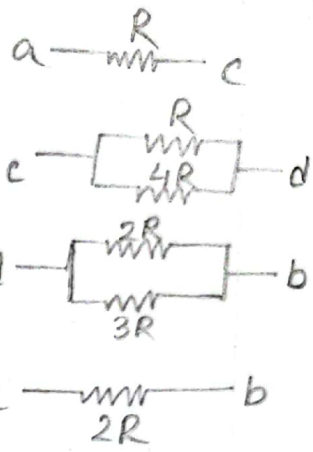
$= 12\ \Omega$



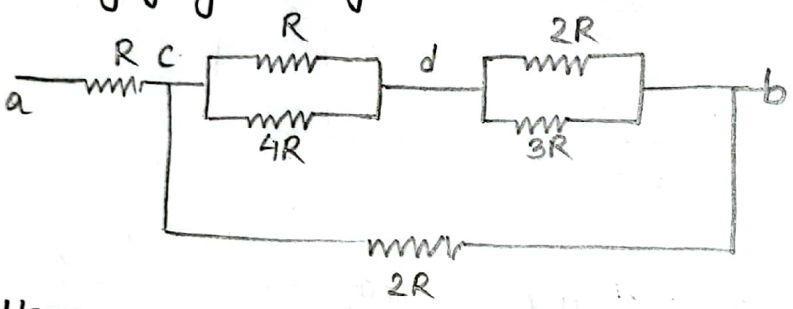


Answer to the Question NO-08

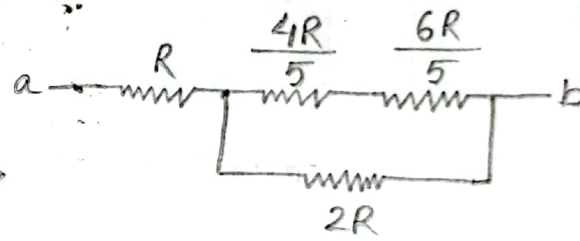




Simplyfying the given circuit,



$\Rightarrow$



Here,

$2R \parallel 3R = \frac{1}{2R} + \frac{1}{3R} = \frac{2R \times 3R}{2R+3R} = \frac{6R^2}{5R} = \frac{6R}{5}$ (parallel)

$R \parallel 4R = \frac{1}{R} + \frac{1}{4R} = \frac{R \times 4R}{R+4R} = \frac{4R^2}{5R} = \frac{4R}{5}$ (parallel)

Now, $\frac{6R}{5} + \frac{4R}{5} = \frac{10R}{5} = 2R$ (series)

Now,

$V = IR$

$\Rightarrow R = \frac{V}{I}$

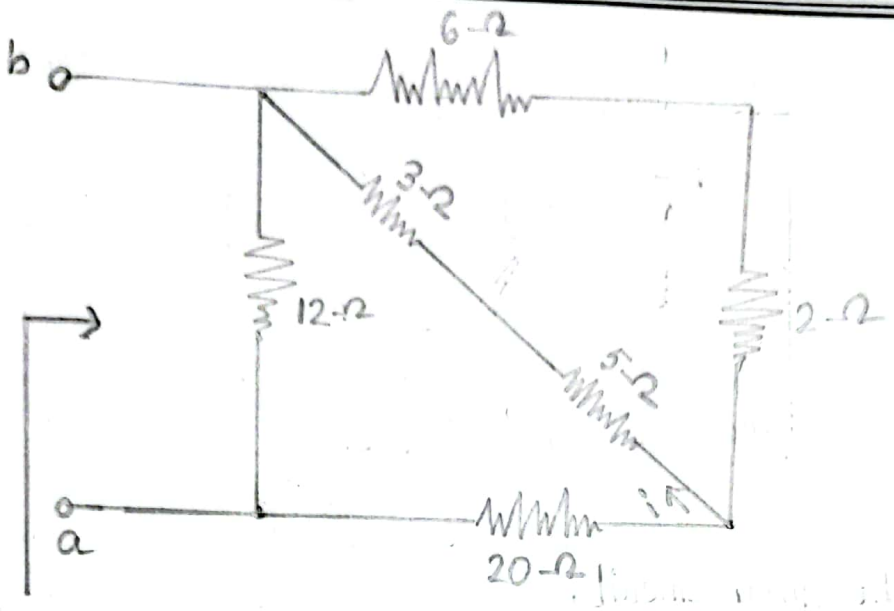
$\Rightarrow 2R = \frac{12}{0.1}$

$\Rightarrow R = 60\,\Omega$

$\therefore R = 60\,\Omega$

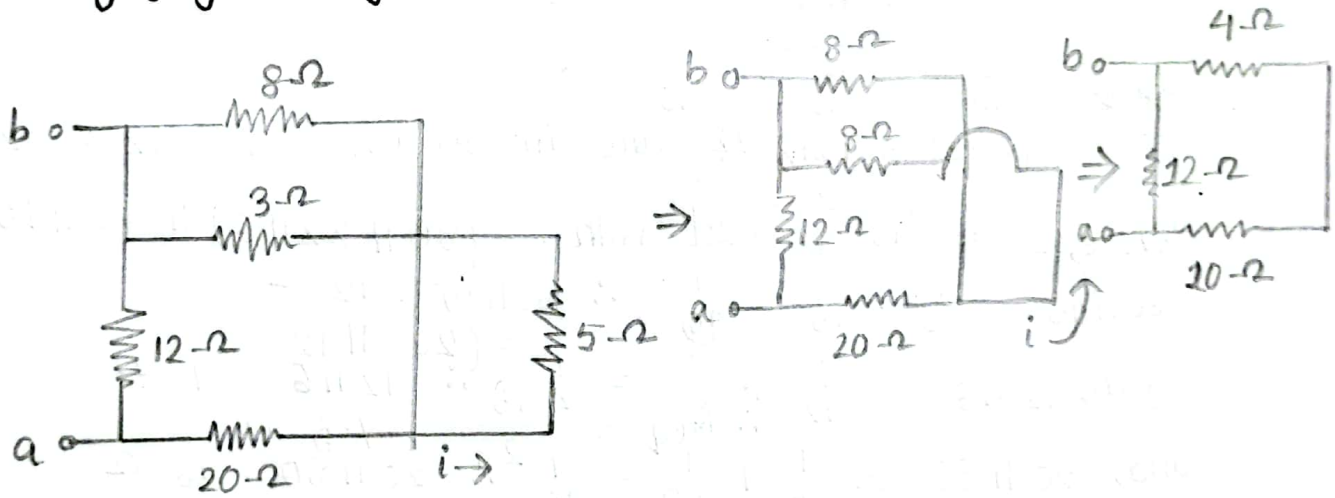
(Ans:)

Answer to the Question NO-09



$R_{eq}{}_{a-b}$

simplyfying the given circuit,

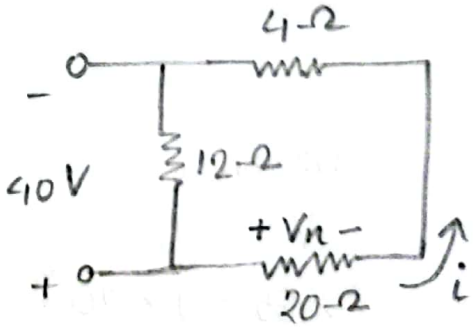


For, $R_{eq} = 24 \,||\, 12 = \frac{24 \times 12}{24+12} = 8\,\Omega$ (Ans:)

for voltage division,

$V_R = 40\left(\frac{20}{20+4}\right) = \frac{100}{3}\,V$

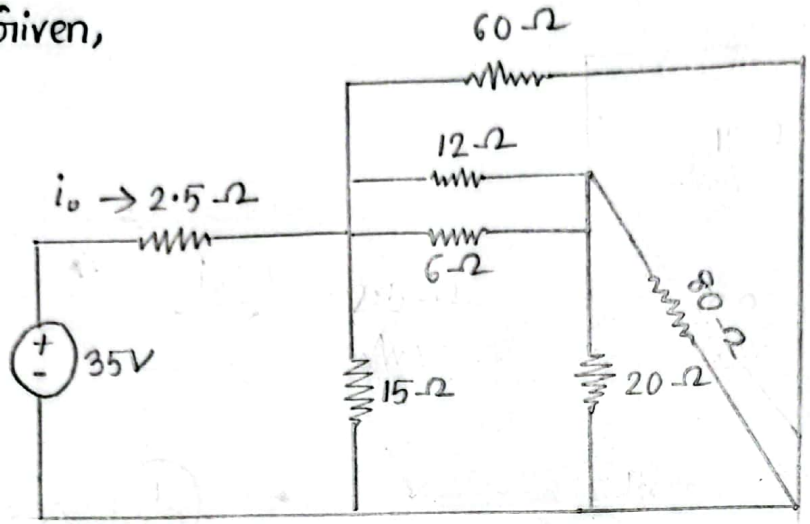
$\therefore I_R = \frac{\frac{100}{3}}{20} = 5/3\,A$



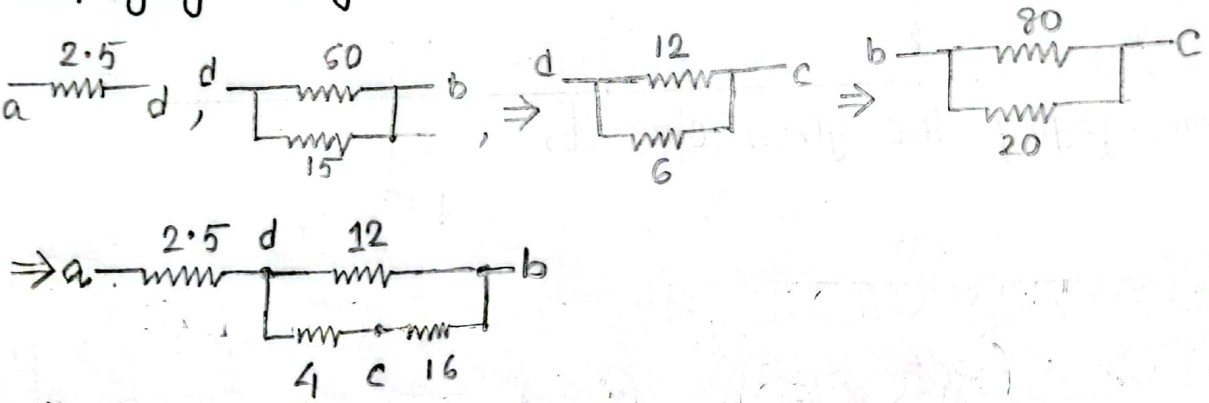
$\therefore$ current division, $i = I_R\left(\frac{8}{8+8}\right) = 5/6 = 0.83\,A$ (Ans:)

Answer to the Question NO - 10

Given,



simplifying the given circuit,



Here,

$60 \| 15 = \frac{1}{60} + \frac{1}{15} = \frac{1}{12}$ $\therefore 60 \| 15 = 12\ \Omega$

again, $12 \| 6 = \frac{1}{12} + \frac{1}{6} = \frac{1}{4}$ $\therefore 12 \| 6 = 4\ \Omega$

and, $20 \| 80 = \frac{1}{20} + \frac{1}{80} = \frac{1}{16}$ $\therefore 20 \| 80 = 16\ \Omega$

Now, $2.5 + (12 \| 20) = 2.5 + \left(\frac{1}{12} + \frac{1}{20}\right)$

$= 2.5 + 7.5$

$= 10\ \Omega = R_{eq}$ (Ans:)

We know,

$V = IR$

$\Rightarrow 35 = I \times 10$

$\Rightarrow I = 3.5\ A$ (Ans:)