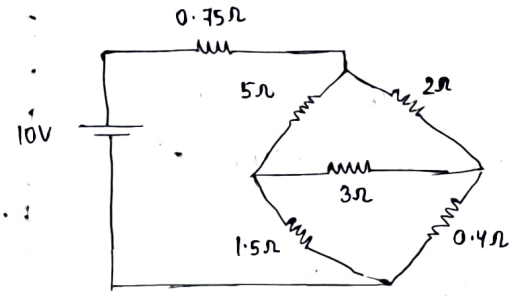
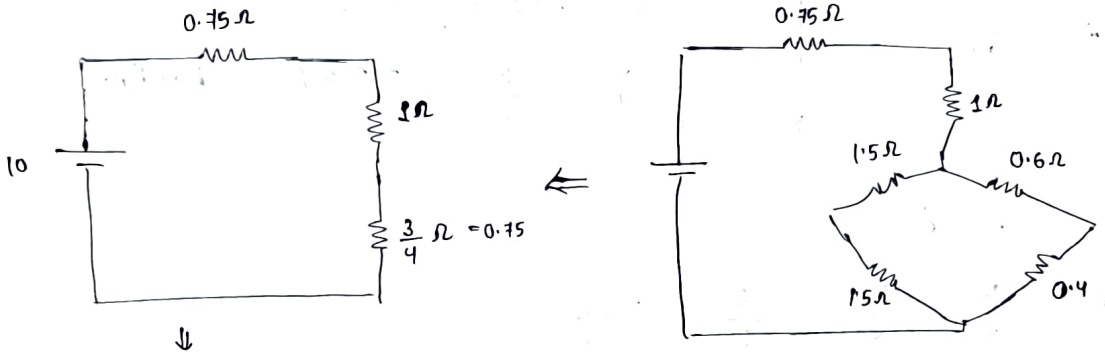
⇒ In the wheatstone bridge circuit shown in fig. Find the effective resistance b/w P & Q. Find the current supplied by 10v battery connected to PQ terminal.

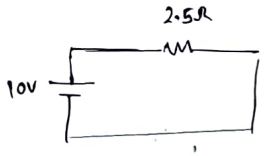
Soln



⇓



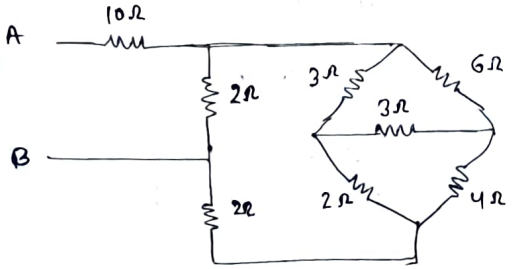
⇓



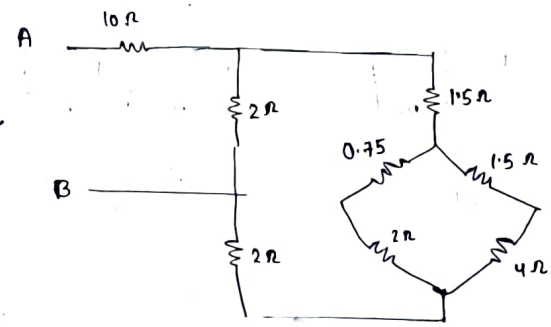
$3 \times 1 / 3+1$

$i = \frac{10}{2.5} = \frac{100}{25} = 4A$

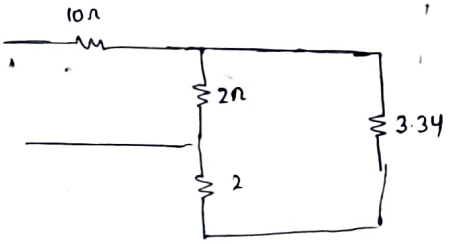
⇒ Find equ^{v} resistance b/w A & B of :



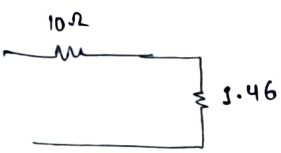
⇒



⇓



⇐



⇓

11.46Ω

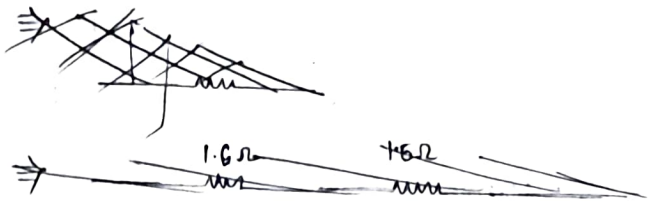
$2.75 \times 6 / 8.75$

1.89

1.50

8.39

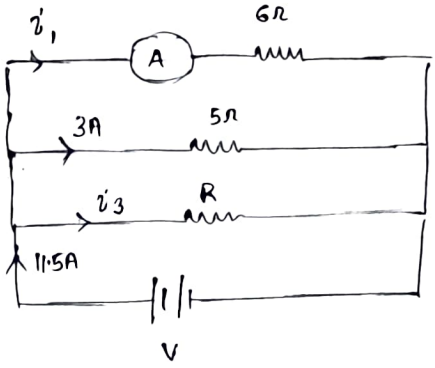
5.34



⇒ Determine :

i) The reading on ammeter

ii) The value of resistor (R)



Soln $11.5 = i_1 + 3 + i_3$

$i_1 + i_3 = 8.5$

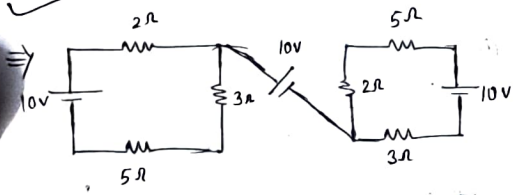
$i_3 = 6\ A$

$V = 3 \times 5 = 15\ V$

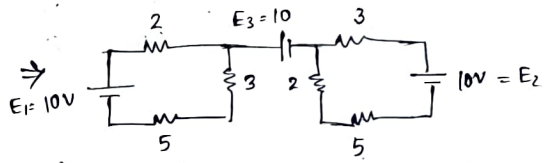
$i_1 = \frac{15}{6} = 2.5\ A$ (Reading)

ii) $R = \frac{V}{i_3} = \frac{15}{6} = \frac{5}{2} = 2.5\ \Omega$

imp

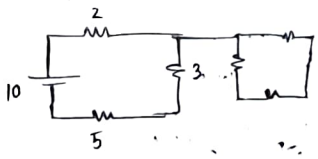


⇒



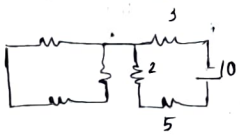
Soln

Consider E_1



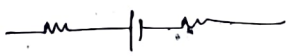
$i = \frac{10}{10} = 1\ A$

Consider E_2



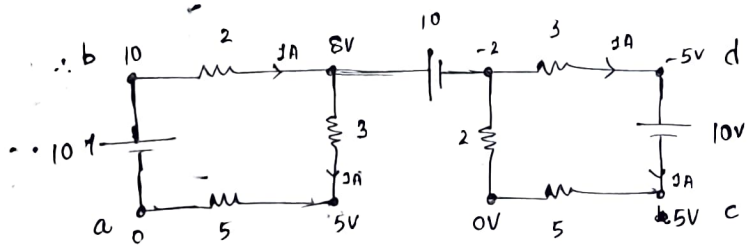
$i = \frac{10}{10} = 1\ A$

Consider E_3



$i = 0$

cause no loop

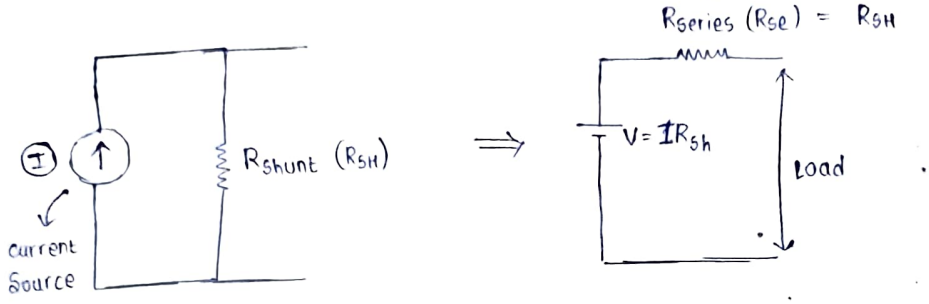


$\therefore V_{ad} = V_a - V_d = 0 - (-5) = 5V$

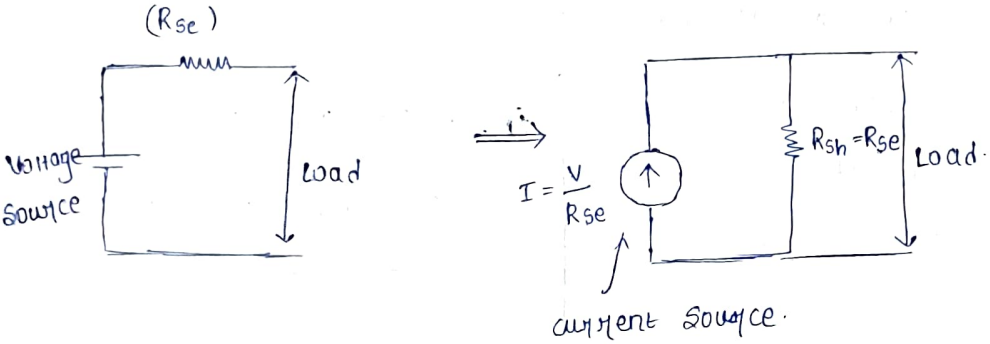
$V_{bc} = V_b - V_c = 10 - 5 = 5V$

Source Transformation :

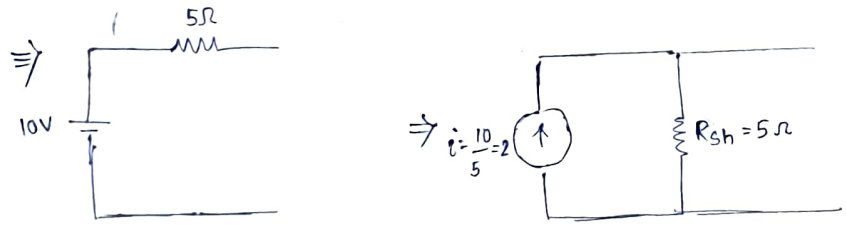
→ Current Source to Voltage Source :

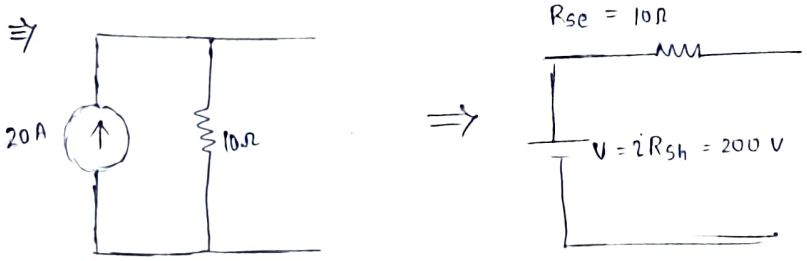


→ Voltage Source to Current Source :



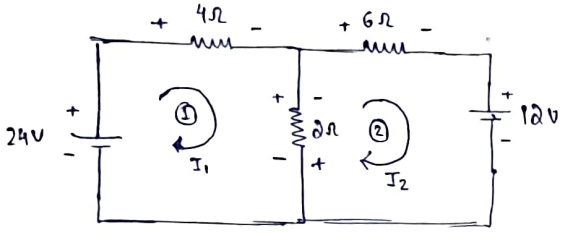
→ Example :





Mesh / Loop Current Method :

⇒ Determine the current through various resistors using the concept of mesh current method ?



Sorry Always take dir^n of loop same.

then take sign of resistors according to dir^n of i

① $\longrightarrow$ $24 - 4I_1 - 2I_1 = 0$

$I_1 = 4A$

② $\longrightarrow$ $-6I_2 - 12 - 2I_2 = 0$

$8I_2 = -12$

$I_2 = \frac{-3}{2} = -1.5\ A$

(wrong method).

① $\longrightarrow$ $24 - 4I_1 - 2(I_1 - I_2) = 0$

$24 - 4I_1 - 2I_1 + 2I_2 = 0$

$24 = 6I_1 - 2I_2$

② $\longrightarrow$ $-6I_2 - 12 - 2(I_2 - I_1) = 0$

$-6I_2 - 12 - 2I_2 + 2I_1 = 0$

$2I_1 = 8I_2 + 12.$

(correct method).

$\therefore$ $8 = 2I_1 - \frac{2}{3}I_2$

$2I_1 = 8I_2 + 12.$

$\frac{24 - 2}{3}$

$\Rightarrow 8 = 8I_2 + 12 - \frac{2}{3}I_2$

$\Rightarrow -4 = \frac{22}{3}I_2$

$\Rightarrow I_2 = \frac{-12}{22} = \frac{-6}{11}\ A.$

$I_1 = 4I_2 + 6$

$= \frac{-24}{11} + 6 = \frac{42}{11}\ A$