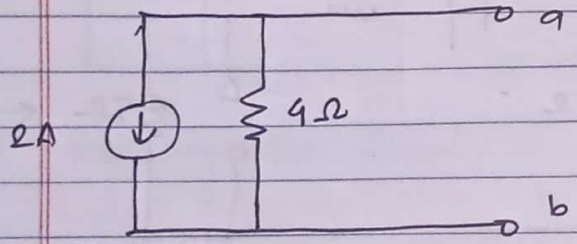
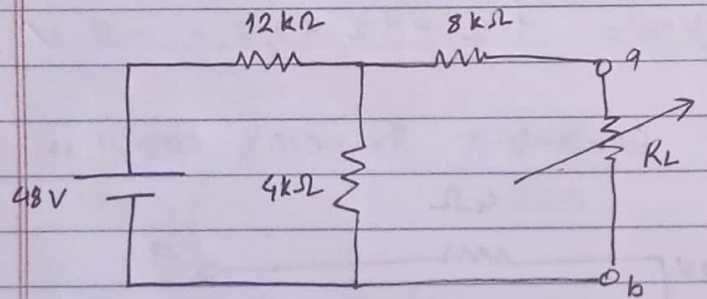
$I_N = \frac{8}{4} = 2A.$

$R_N = R_{TH} = 4\Omega$

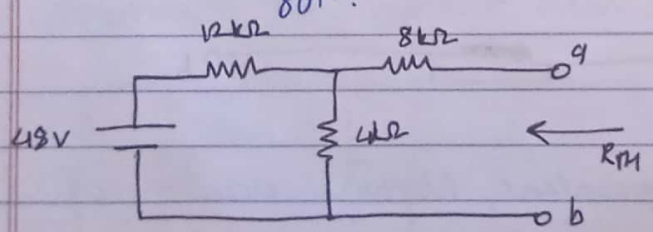


Thevenin's

(Num.No. 57) Find equivalent circuit teminals a-b.



SOLN:



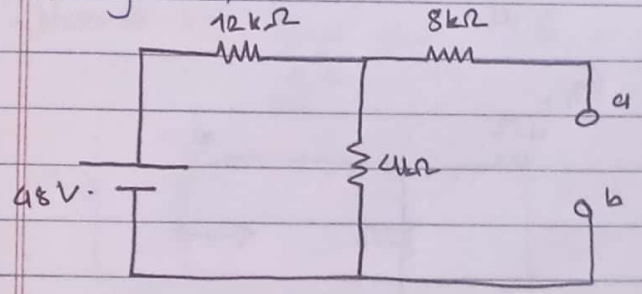
Finding R_{TH},

$R_{TH} = (12 \| 4) + 8$

$= \left(\frac{12 \times 4}{16}\right) + 8$

$\therefore R_{TH} = 11k\Omega$

Finding V_{TH},



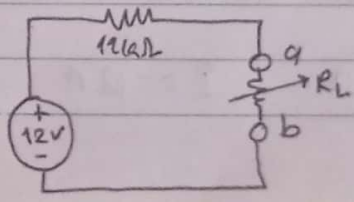
$R_{eq} = 16$

$\therefore I_{TH} = \frac{V}{R_{eq}} = \frac{48}{16} = 3mA$

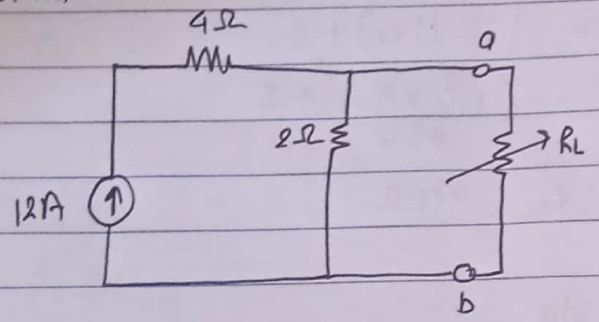
Thus,

$V_{across\ 4\Omega} = V_{ab} = 3 \times 4 = 12\ V$

Thevenin's equivalent theorem,

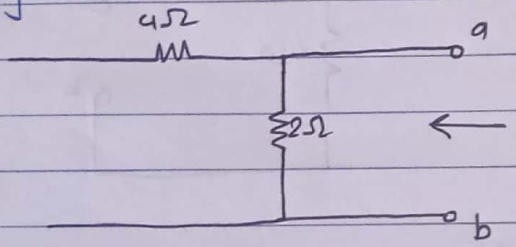


(Num. No 58): Find the Thevenin's equivalent circuit.



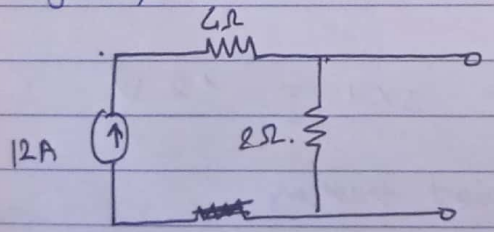
Soln.

Finding R_{TH},



$R_{TH} = 2\Omega$

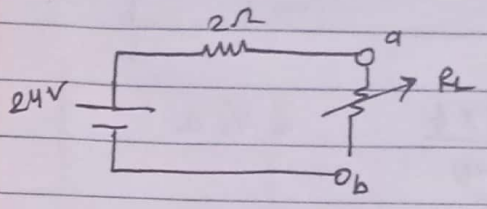
Finding V_{TH},



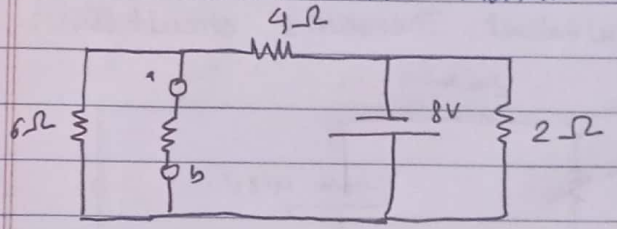
$R_{eq} = 6\Omega$ $I = 12A$ $\therefore V_{TH} = 72V$

$\therefore V_{TH} = V_{2\Omega} = \frac{2 \times 72}{6} = 24V.$

The equivalent circuit is,

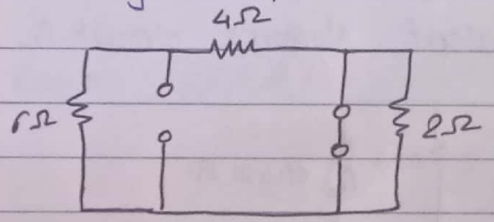


(Num. No. 59): Find the Norton's equivalent circuit.



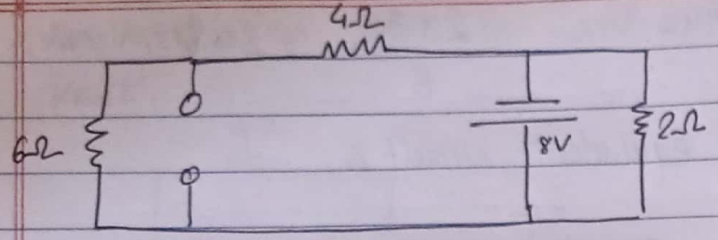
Soln:

Finding R_{TH},



$R_{TH} = 4 \| 6 = \frac{4 \times 6}{10} = 2.4\Omega$

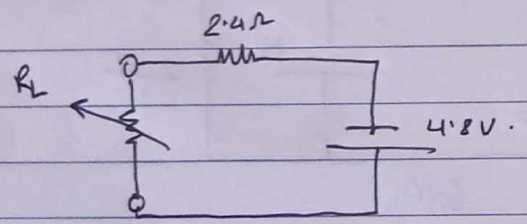
finding V_{TH},



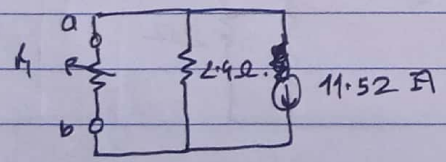
$V_{TH} = \frac{8 \times 6}{10} = V_{6\Omega}$

$= 4.8\ V.$

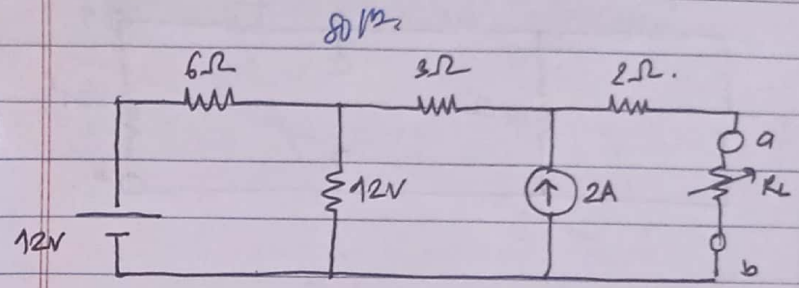
The equivalent Thevenin's circuit is.



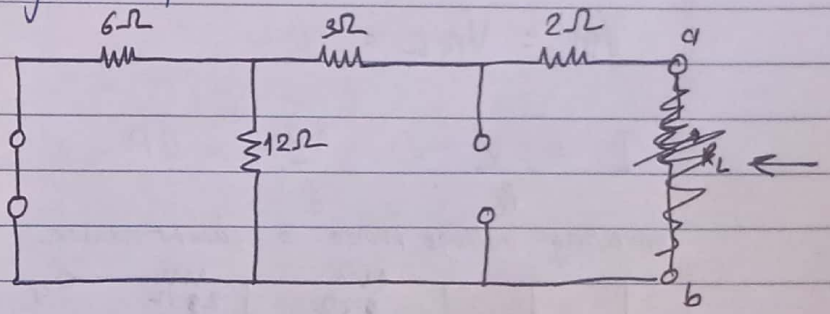
The equivalent Norton's circuit is.



Num. No. 60): Find the value of R_L for maximum power transfer in the circuit. Find P_{max}.



Finding R_{TH},



$R_{TH} = ((12 \| 6) \| 12) + 6$

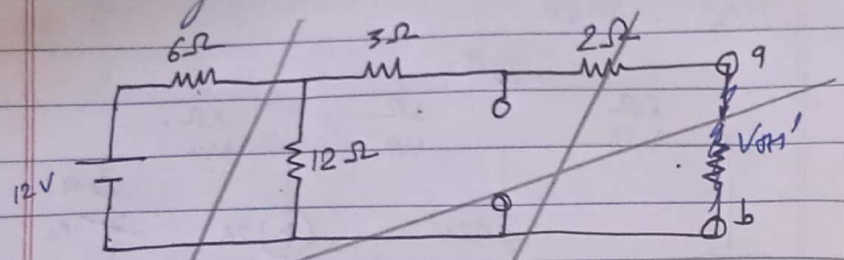
$= \frac{5}{12} + 6 = (6 \| 12) + 5$

$= \frac{6 \times 12}{18} + 5$

$= 9\Omega.$

Finding V_{TH},

~~Considering 12 V voltage source.~~

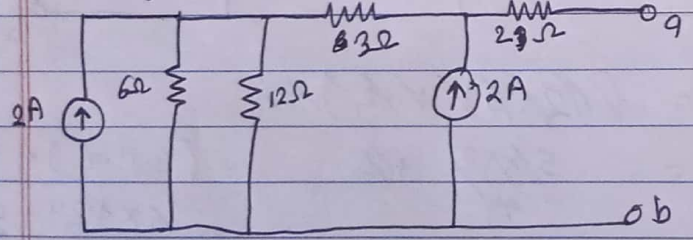


$R_{eq}' = 6 + 12 = 18\ \Omega$

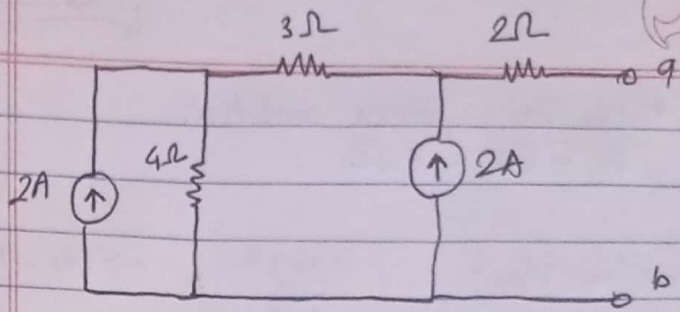
$V_{TH}' = V_{12\Omega} =$

$I = \frac{V}{R_s} = \frac{12}{6} = 2A$

Converting voltage source to current source.

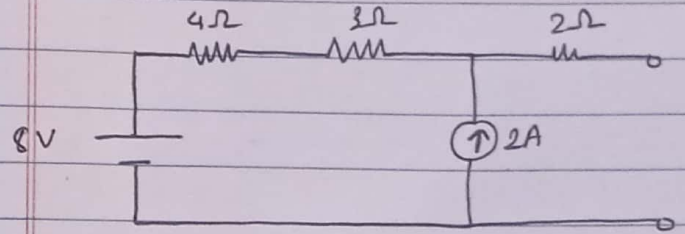


$R' = 6 \| 12 = \frac{6 \times 12}{18} = 4\ \Omega$

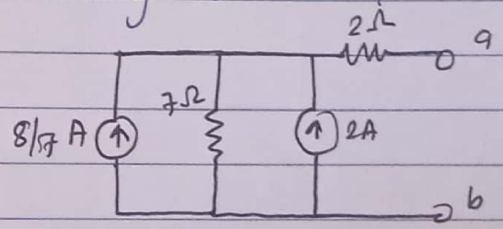


Converting 2A current to voltage source,

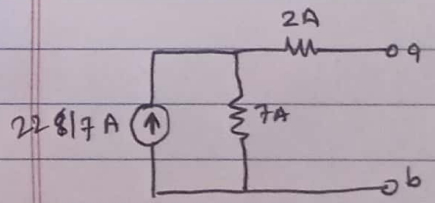
$V = IR = 8V$



Converting 8V voltage to current source.



$I = (8/7 + 2) = 22/7\ A$



$V_{TH} = V_{7\Omega} = \frac{22}{7} \times 7 = 22\ V$

For maximum power condition,

$R_L = R_{TH} = 9\,\Omega$.

$\therefore P_{max} = \frac{V_{TH}^2}{4 \times R_L} = \frac{(22)^2}{4 \times 9} = 13.44\ W.$