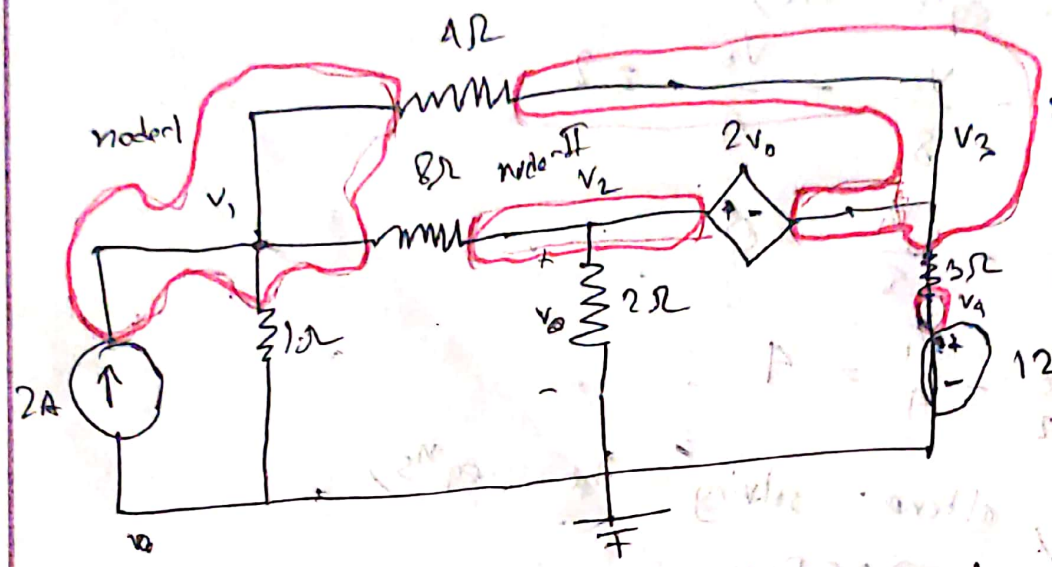
Maruf Morshed
20101299

Ans no. Q1



Here, there are 4 nodes with grounds, V_1, V_2, V_3, V_4

$V_4 = 12V$

for node-1 (V_1) :

$$V_1\left(\frac{1}{1}+\frac{1}{8}+\frac{1}{4}\right)-\frac{0}{1}-\frac{V_2}{8}-\frac{V_3}{4}-2=0$$

or, $V_1 \cdot \frac{11}{8} - \frac{V_2}{8} - \frac{V_3}{4} - 2 = 0$

for node-(II) (V_2):

$$V_2\left(\frac{1}{8}+\frac{1}{2}\right)-\frac{V_1}{8}-\frac{0}{2}=0$$

or, $V_2 \cdot \frac{5}{8} - \frac{V_1}{8} = 0$

For node (III), V_3 :

$$V_3\left(\frac{1}{3}+\frac{1}{4}\right)-\frac{V_4}{3}-\frac{V_1}{4}=0$$

$$\Rightarrow V_3 \cdot \frac{7}{12} - \frac{12}{4} - \frac{V_1}{4} = 0$$

Now,

The Three eq^{n}s are,

i) $V_1 \cdot \frac{11}{8} - \frac{V_2}{8} - \frac{V_3}{4} \cdot 2$

ii) $V_2 \cdot \frac{5}{8} - \frac{V_1}{8} = 0$

iii) $V_3 \cdot \frac{7}{12} - \frac{V_1}{4} = 4$

Here, after solving the eq^{n}s,

$V_1 = 2.9885\ V$

$V_2 = 0.5977\ V$

$V_3 = 8.13793\ V$

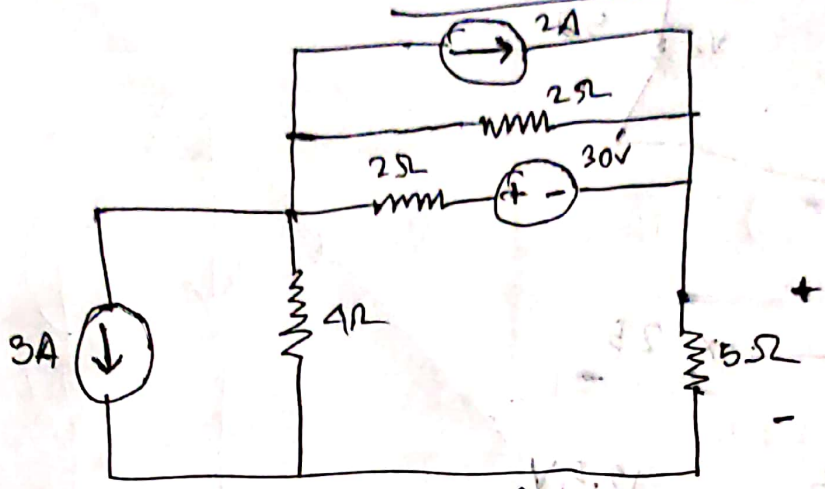
Here,

$V_o = V_2 - 0$ [$\because$ because of ground voltage]

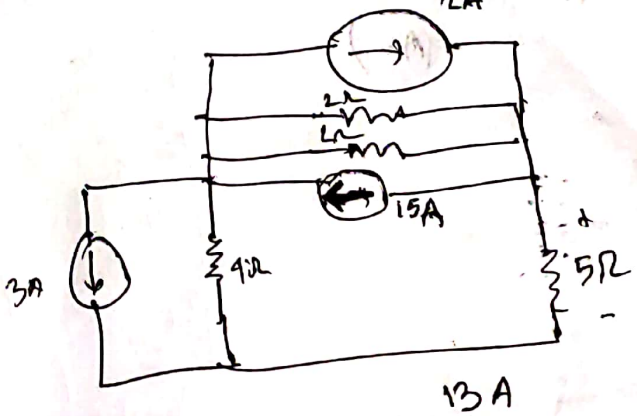
or, $= 0.5977\ V$

(Ans.)

Ans no (Q2)

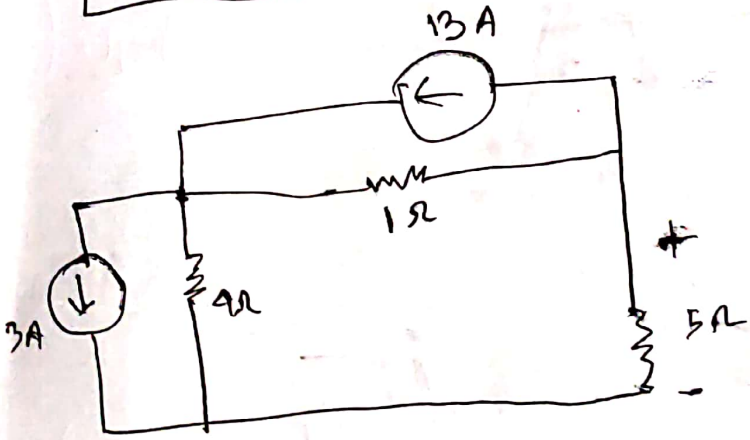


ii)

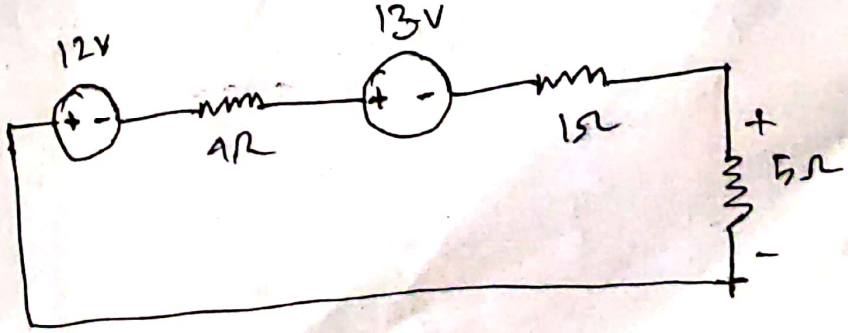


[Transforming 2Ω and 30V]

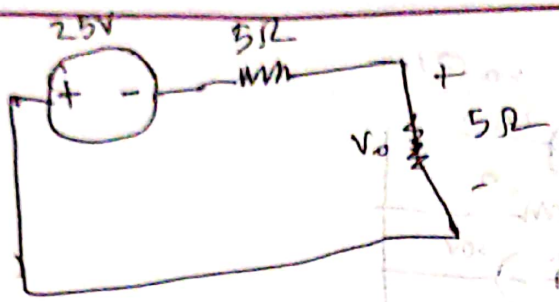
iii)



iv)



v)



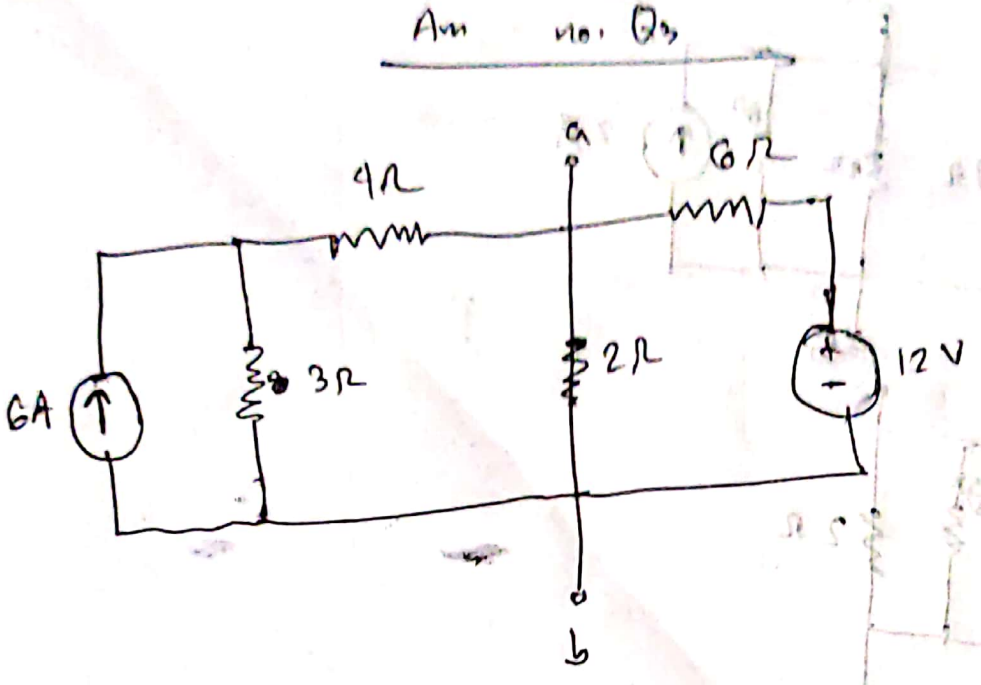
Here,

$$V_o = \frac{5}{5+5} \times 25$$

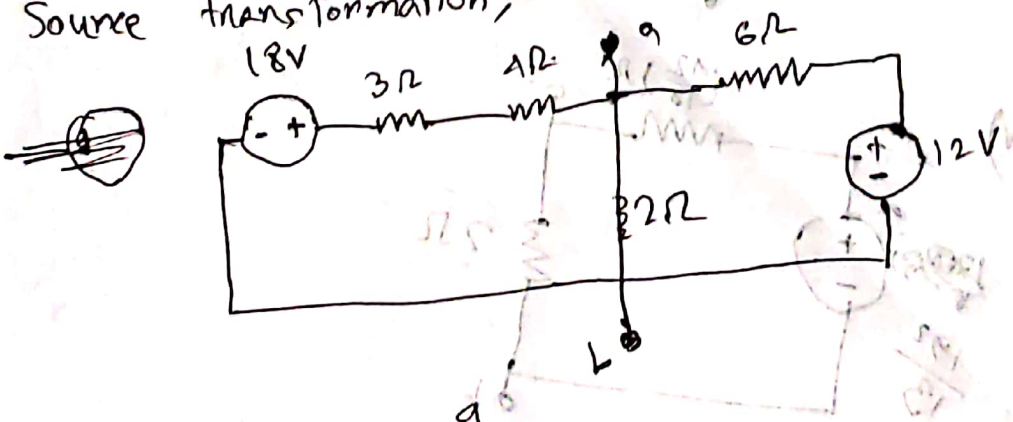
$$= \frac{25}{2} = 12.5\,V$$

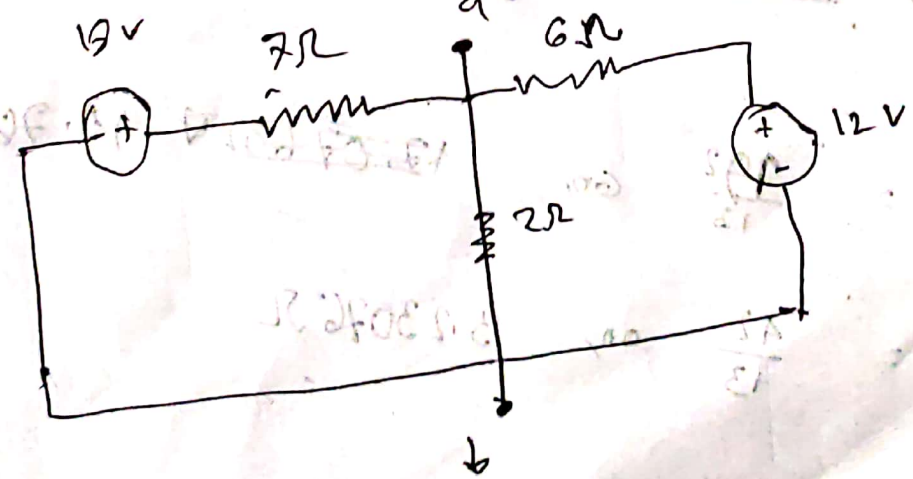
(Ans.)

Ans no. 03



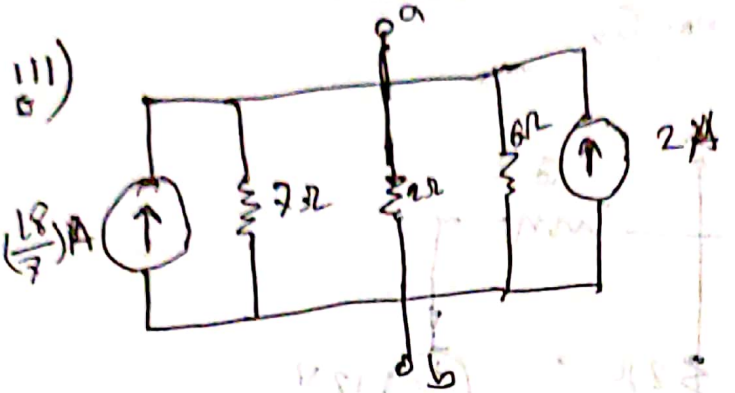
Using Source transformation,



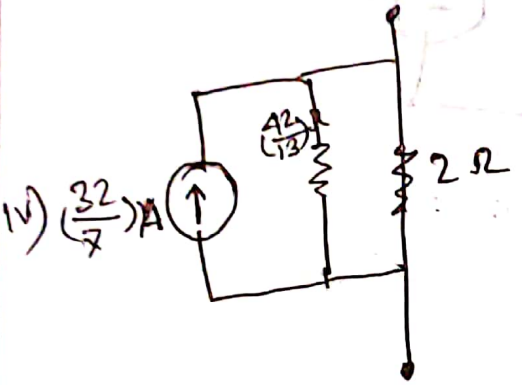


[3Ω and 4Ω as series.]

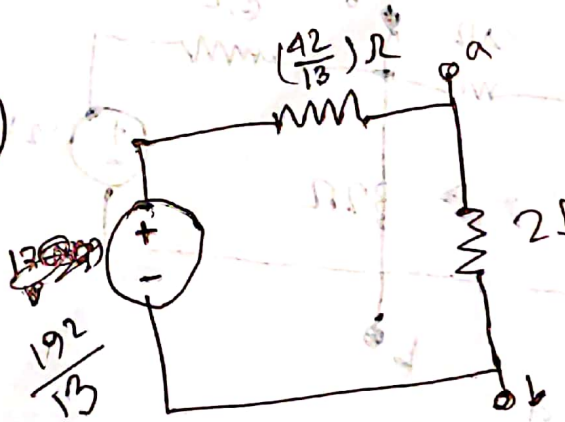
iii)



iv)



v)



Here,

$V_{th} = \frac{192}{13}$ Ans

~~13.0769 V~~ 14.7692

$R_{th} = \frac{42}{13}$ Ans $3.23076\ \Omega$

2.) A thevenin equivalent circuit is drawn