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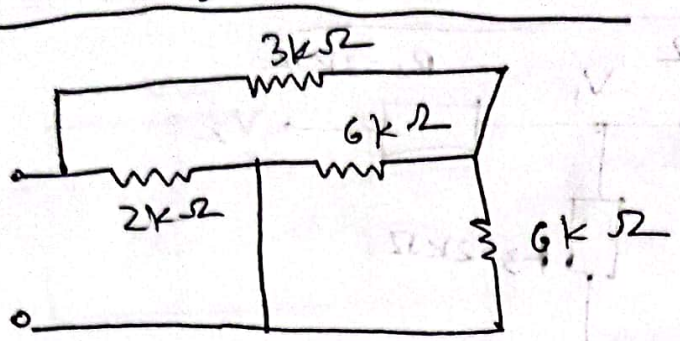
sec: 11

CSE 350
HW 1

Ans. to the question no. 01:



Here, 6kΩ and another 6kΩ resistor are in Parallel.

$\therefore R_1 = \left(\frac{1}{6} + \frac{1}{6}\right)^{-1} = 3k\Omega$

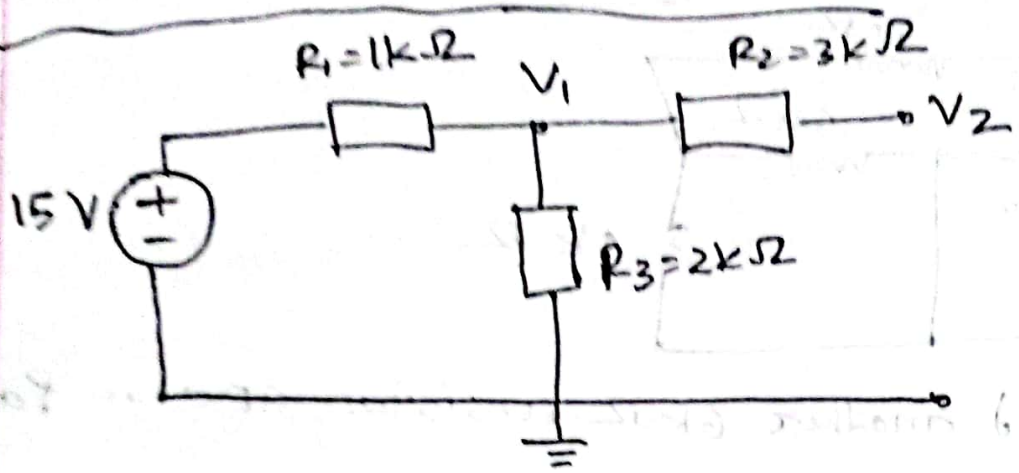
Now, R_1 and 3kΩ resistors are in series.

$\therefore R_2 = (3+3) = 6k\Omega$

Finally R_2 and 2kΩ are in Parallel.

$\therefore Req = \left(\frac{1}{6} + \frac{1}{2}\right)^{-1} = 1.5\ k\Omega$

Ans. to the question no.02:



At V_1 —

$$V_1\left(\frac{1}{1}+\frac{1}{2}+\frac{1}{3}\right)-\frac{15}{1}-\frac{V_2}{3}=0 \quad \text{——} (1)$$

since, no current flow between V_1, V_2.

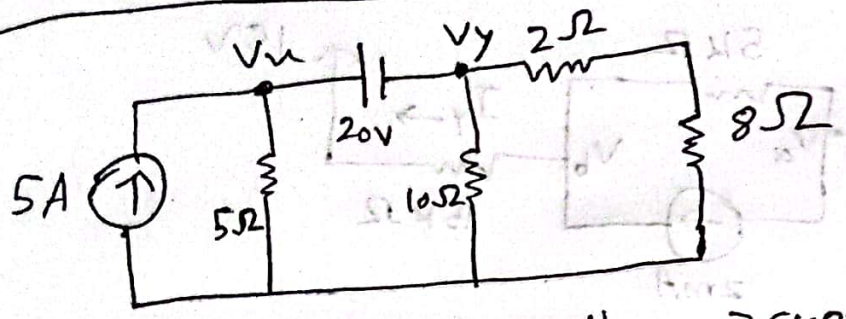
so. $V_1 = V_2$ —— (11)

By calculation, $V_1 = 10V$

$V_2 = 10V$

open circuit output is 10V.

Ans. to the question no.03:



Here, V_x and V_y together → supernode.

$$\frac{V_x - 0}{5} - 5 + \frac{V_y - 0}{10} + \frac{V_y - 0}{2+8} = 0 \quad \text{——— (I)}$$

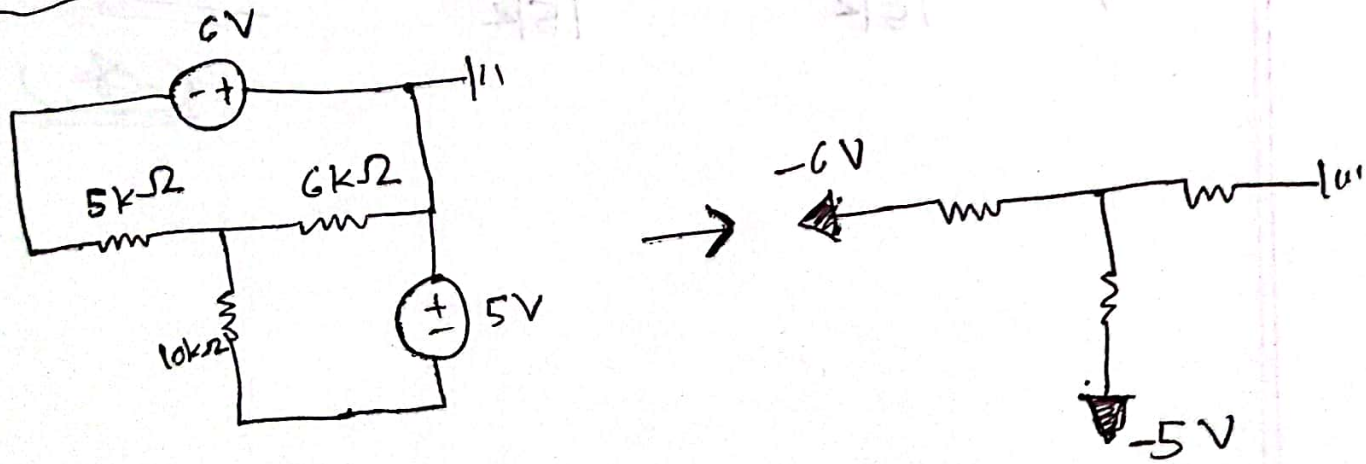
Again, $V_x - V_y = 20$ ——— (II)

By calculating, $V_x = 22.5\,V$, $V_y = 2.5\,V$

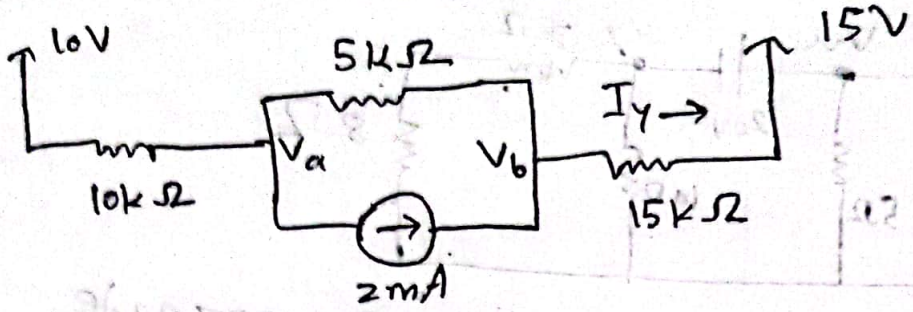
∴ voltage across the current source, $(V_x - 0)$

$= 22.5\,V$ Ans.

Ans. to the question no.04:



Ans. to the question no. 05



For node V_a –

$$\frac{V_a - 10}{10k} + 2mA + \frac{V_a - V_b}{5k} = 0 \quad \text{——— (I)}$$

For node V_b –

$$\frac{V_b - V_a}{5k} - 2mA + \frac{V_b - 15}{15k} = 0 \quad \text{——— (II)}$$

By calculating $V_a = 8.33V$

$V_b = 17.5V$

$$\therefore I_y = \frac{V_b - 15}{15k} = \frac{17.5 - 15}{15k} = 0.167mA$$