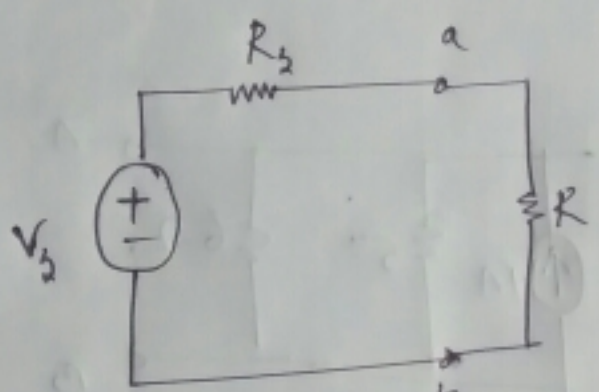
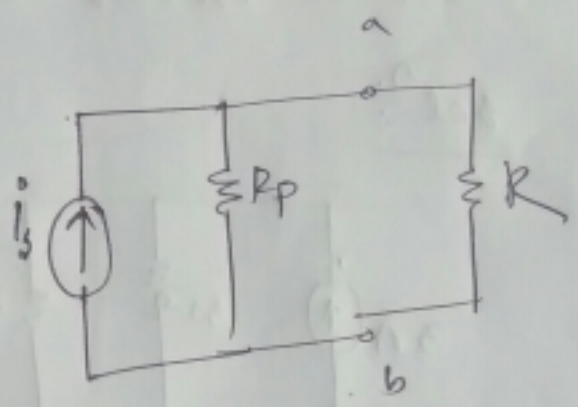
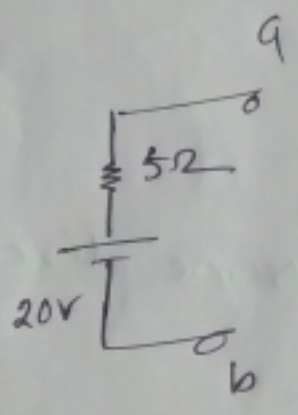
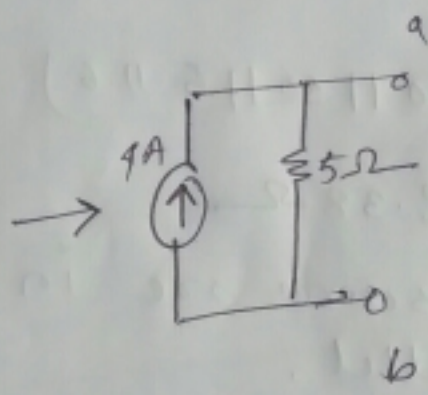
Source transformation: A voltage source V_s is connected in series with resistor R_s and a current source I_s is connected in parallel with a resistor R_p are equivalent ckt provided that

$$R_p = R_s \quad \& \quad V_s = R_s I_s$$

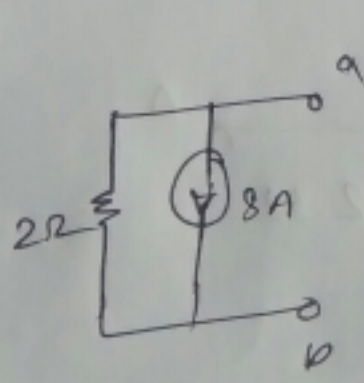


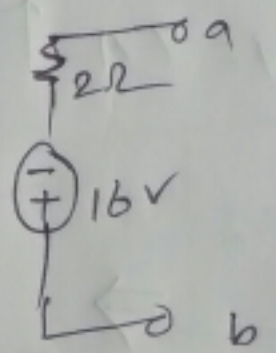






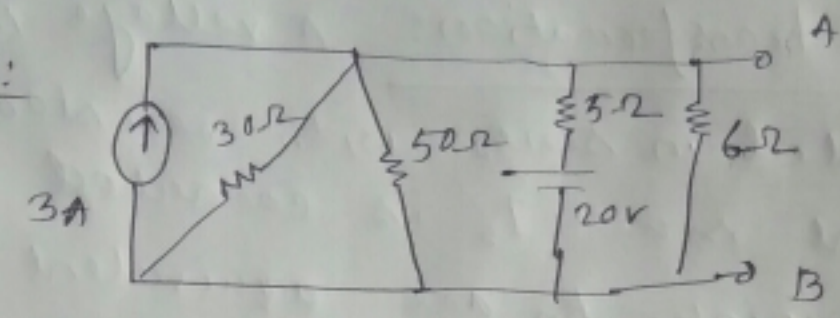
$$I = \frac{20}{5} = 4A \uparrow$$





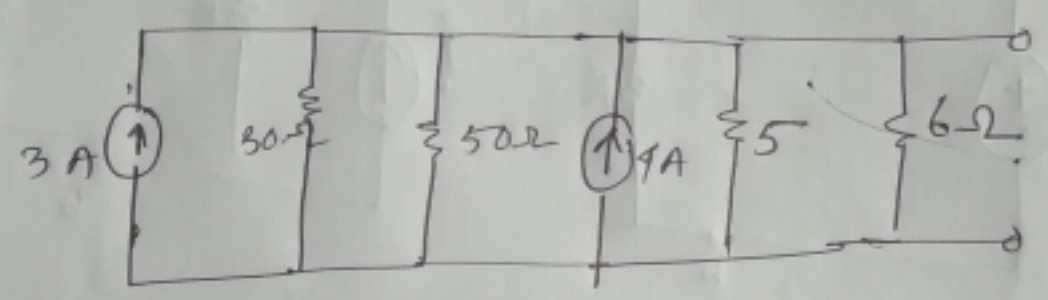
$$V = 8 \times 2 = 16V$$

Ex:



Reduce network A & B into a single voltage source series with a resistor

Sol^{n}:

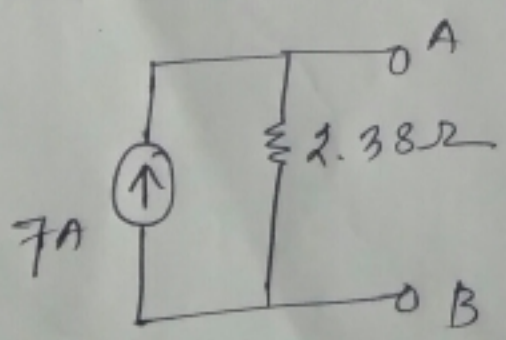


Here $R_{eq} = (30 \,||\, 50 \,||\, 5 \,||\, 6)$

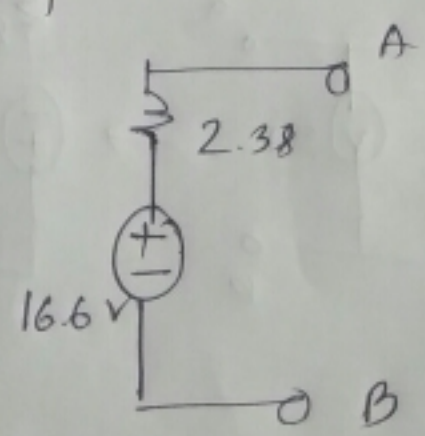
$= 2.38\Omega$

And current source are in same direction but in parallel.

$\therefore \quad I = 3 + 1 = 7A \uparrow$



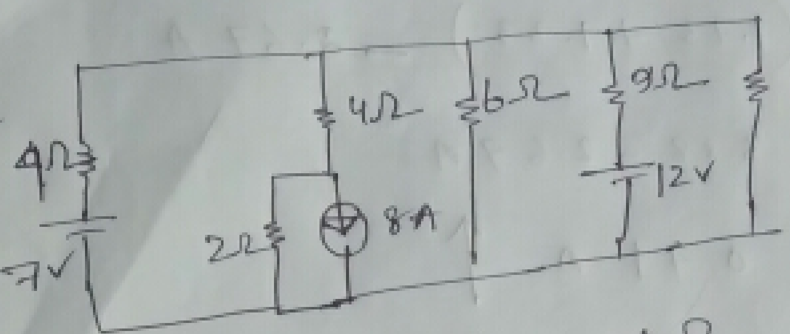
$\Rightarrow$



$V = 7 \times 2.38 = 16.6V$

this is final ckt.

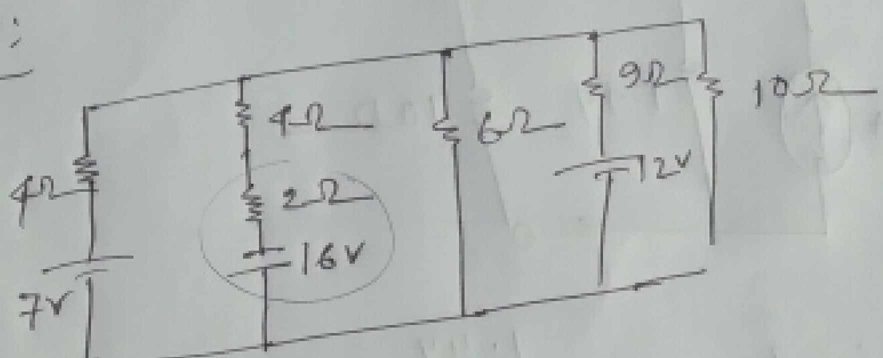
Ex:



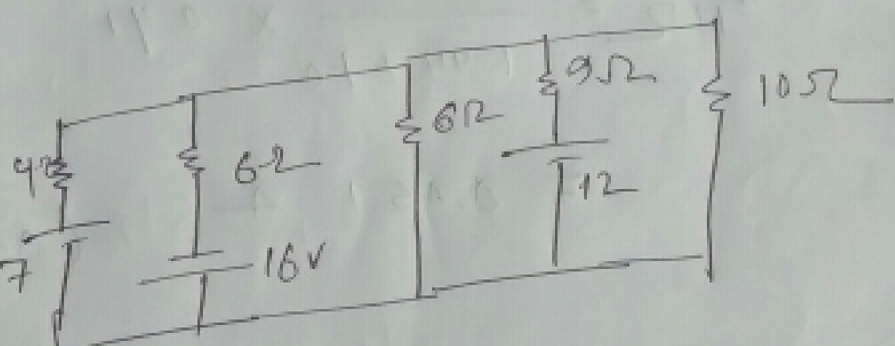
Find current in 10Ω using source transformation.

solⁿ:

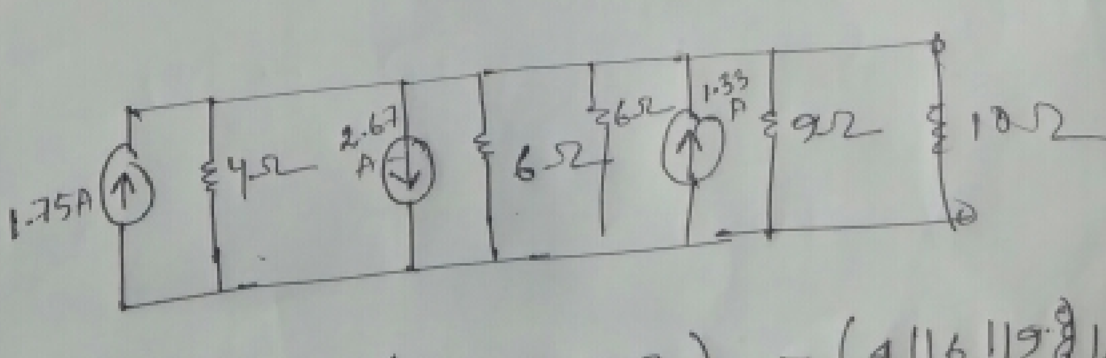
(i)



(ii)



(iii)



here R_{eq} (Exept 10Ω) = (4||6||9||6)
= 1.44Ω

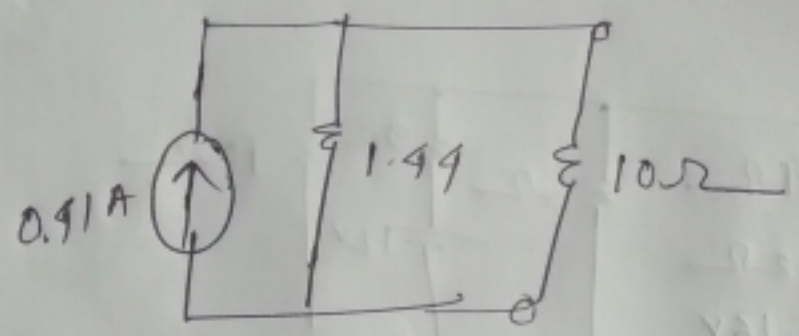
And here parallel এ থাকা সকল ডিভাইসের ও current যোগ
করতে হবে এবং [illegible] Final

$\therefore I = (1.75 + 1.33) - 2.67\ A$

$= 3.68 - 2.67\ A$

$= 0.41\ A \uparrow$

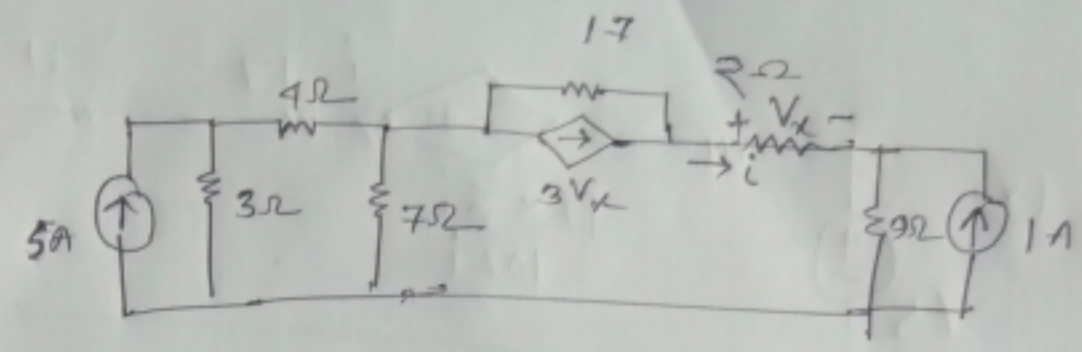
$\therefore$ Final ckt:



$\therefore I_{10\Omega} = \frac{1.44}{1.44 + 10} \times 0.41$

$= 0.051\ A$ (Amps)

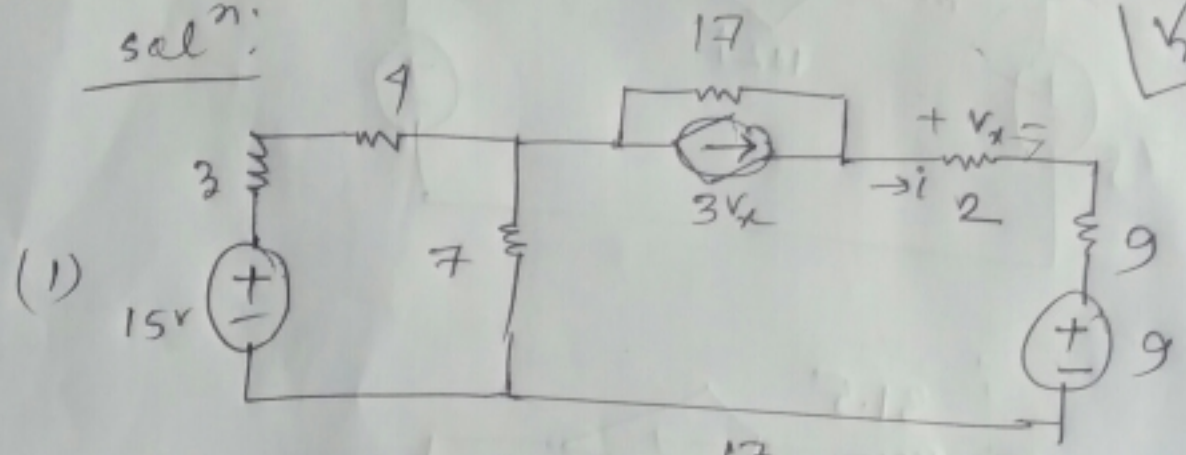
Ex:

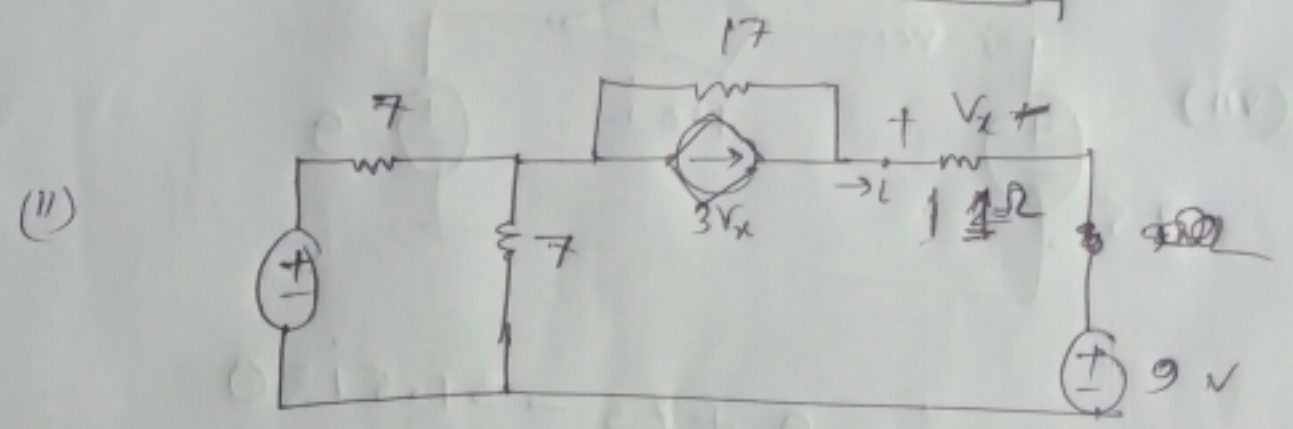


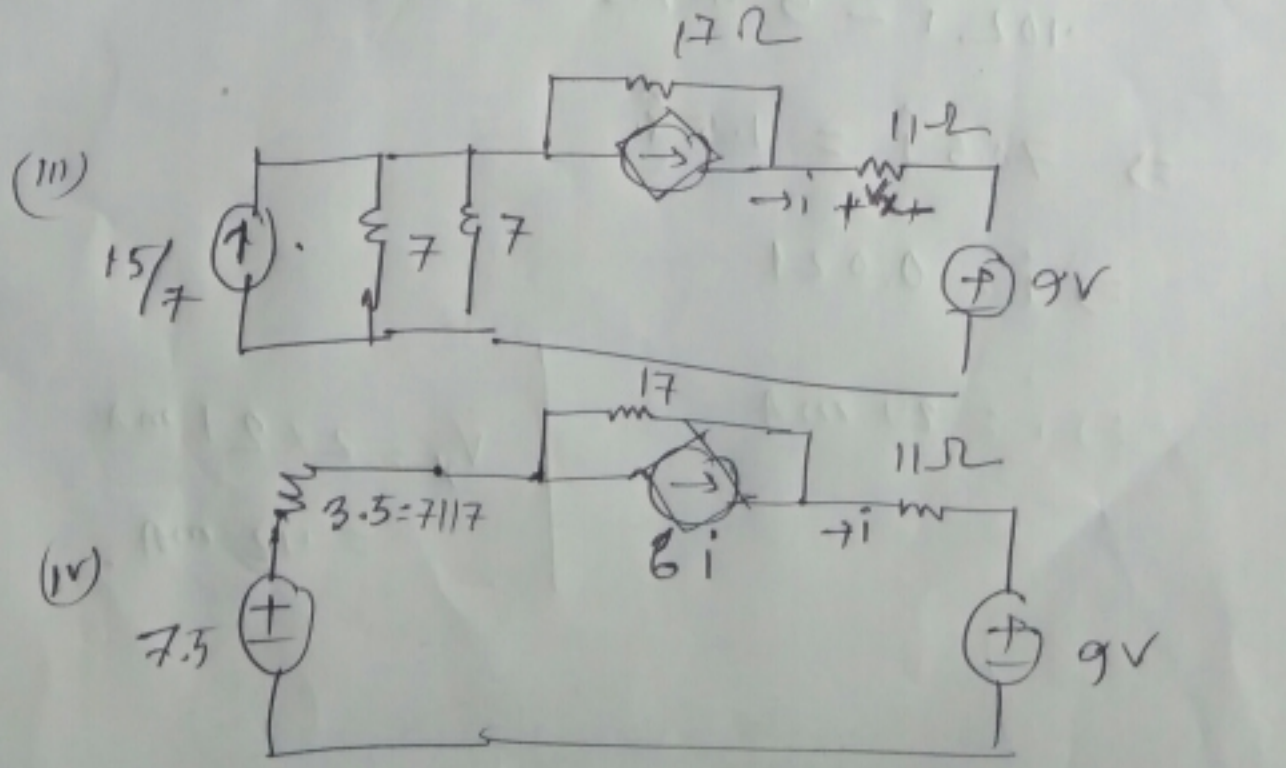
Find i using source transformation

sol^n:

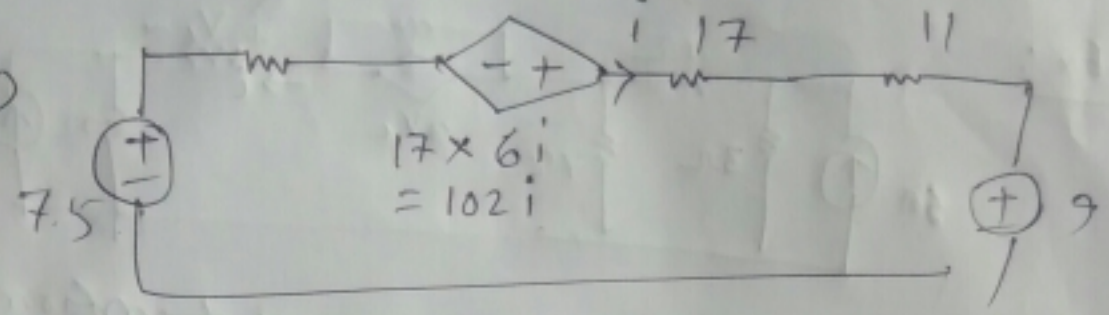
$V_x = 2i$



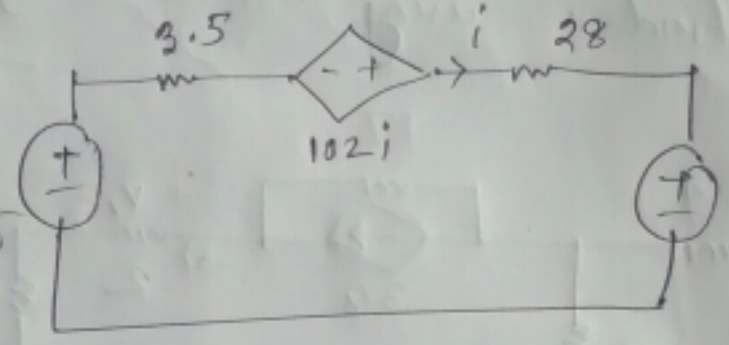




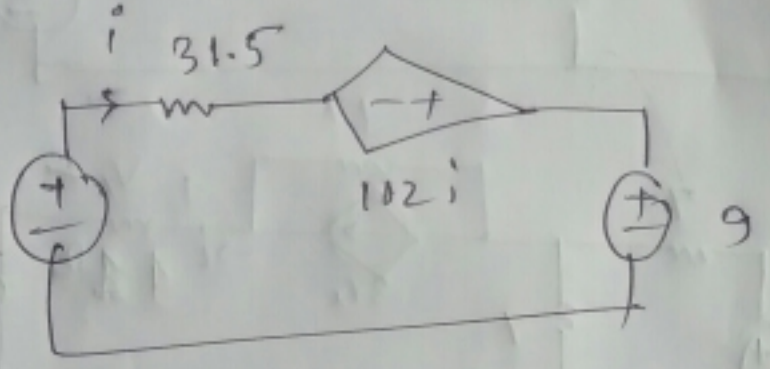
(v)



(vi)



(vii)



$$-102i - 9 + 7.5 - 31.5i = 0$$

$$\Rightarrow 70.5i = 1.5$$

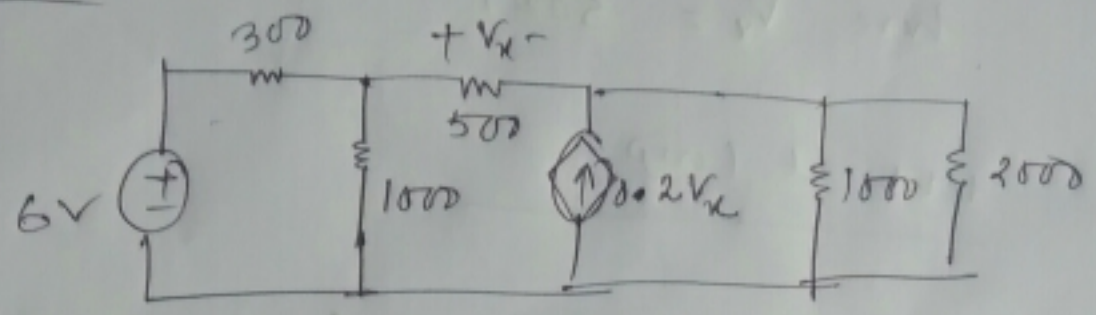
$$\Rightarrow i = 0.021$$

$$\Rightarrow i = 21\ mA$$

$V_x = 2 \times 21\ mA$

$= 42\ mA.$

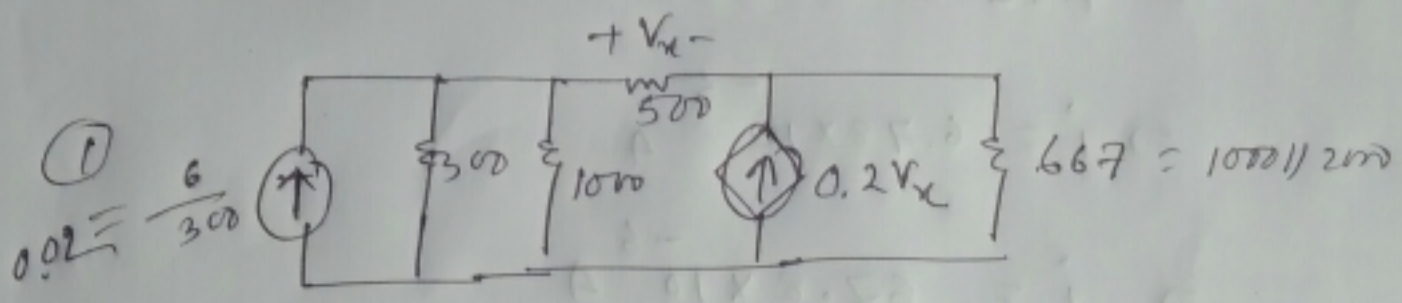
Ex:



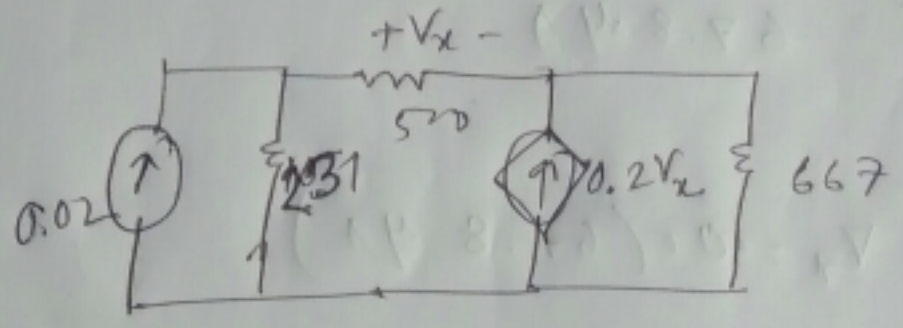
Find V_x

Soln;

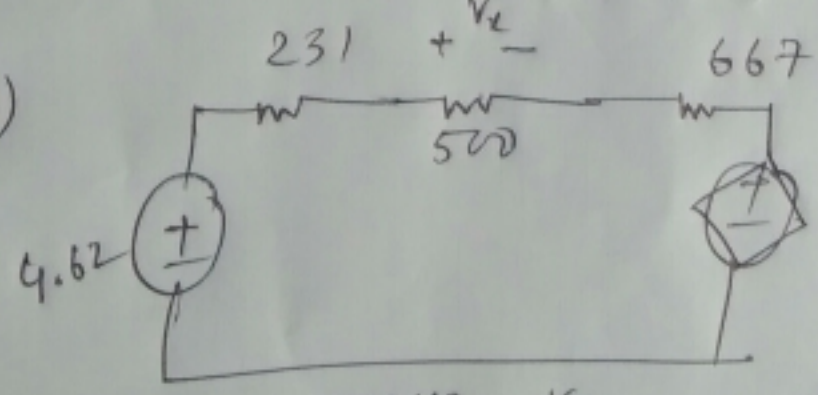
(i)



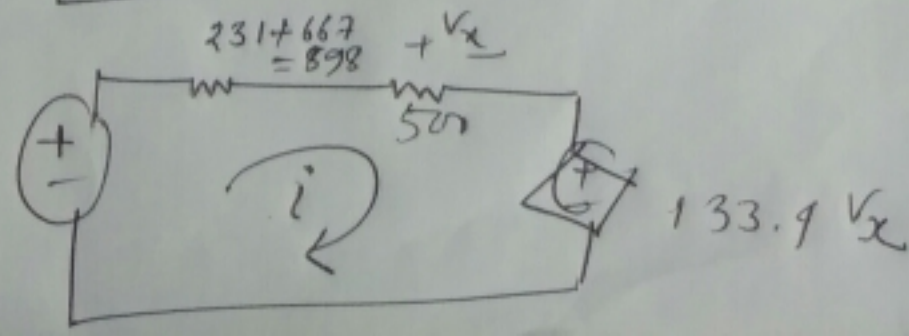
(ii)



(iii)



(iv)



here $V_x = 500i$

KVL at loop

$$+ 4.62 + 898i + 500i + 133.4(500i) = 0$$

$$\Rightarrow 4.62 = 68098i$$

$$\Rightarrow i = 6.78 \times 10^{-5} \text{ A}$$

$$\Rightarrow i = 67.8 \times 10^{-6} \text{ A}$$

$$\Rightarrow i = 67.8 \mu\text{A}$$

$$\therefore V_x = 500(67.8 \mu\text{A})$$

$$= 0.034 \text{ V}$$