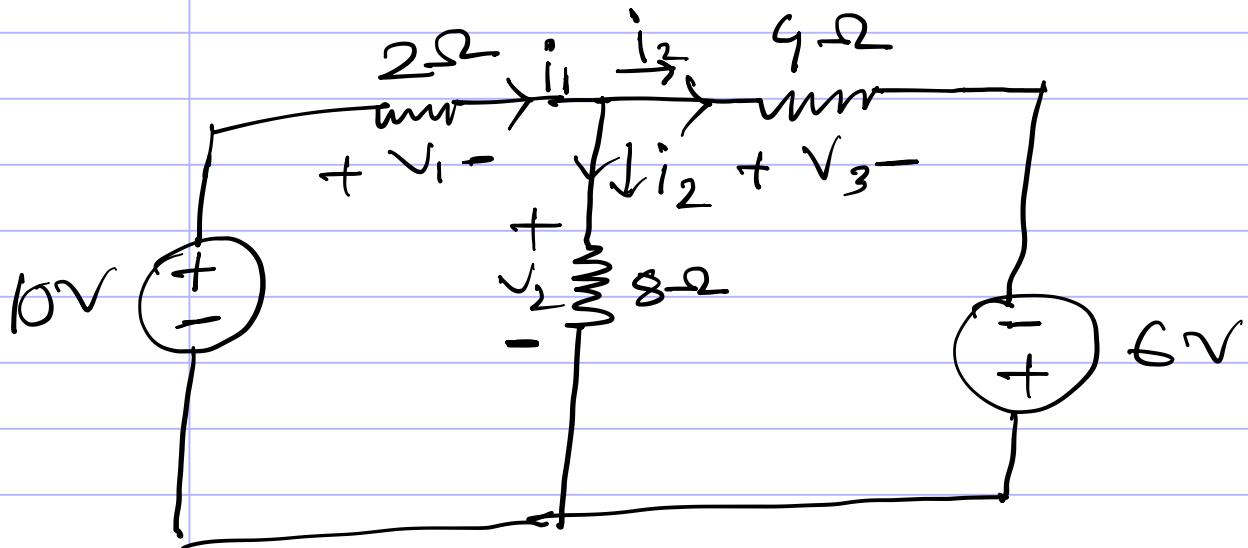
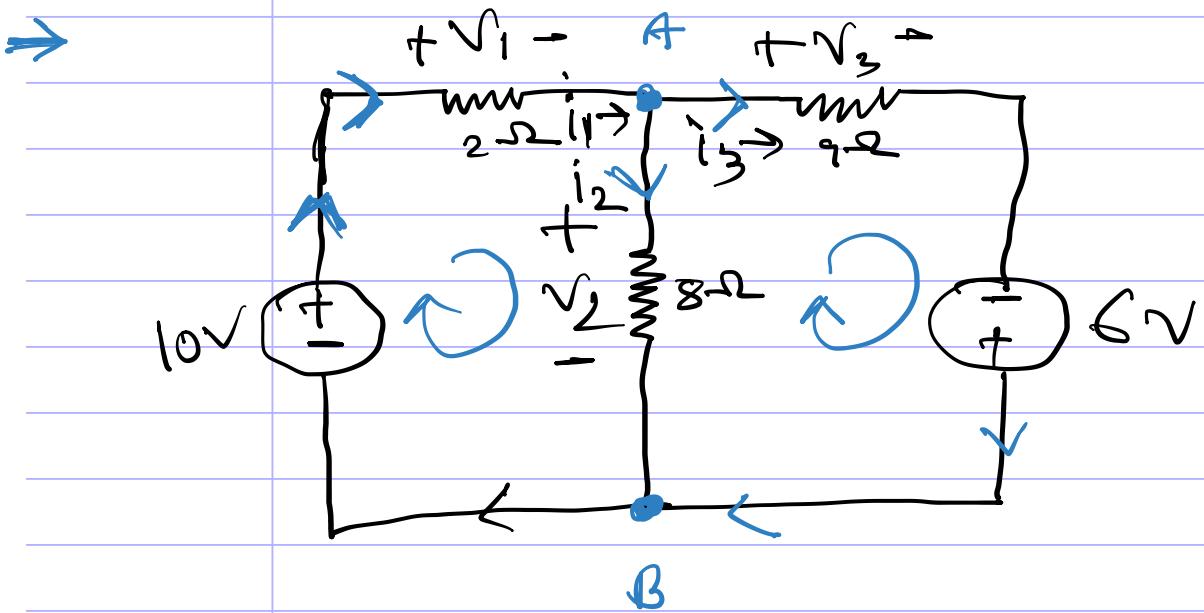


Lee-8



→ Find the currents and voltages in the circuit.

Solution



using KCL at node A:

$$i_1 = i_2 + i_3$$

$$\Rightarrow i_1 - i_2 - i_3 = 0 \quad \text{--- } \textcircled{i}$$

Now using KVL:

Loop 1:  $-10 + V_1 + V_2 = 0$  [current flows clockwise  $V = iR$ ]

$\Rightarrow 2i_1 + 8i_2 = 10$  current flows clockwise  $i_1 = 3A$   $i_2 = 0.5A$   $i_3 = 2.5A$   $V_1 = 6V$   $V_2 = 4V$   $V_3 = 10V$   $\Sigma V = 10V$   $\Sigma i = 0$ ]

Loop 2:

$$-6 - V_2 + V_3 = 0$$

$$\Rightarrow -8i_2 + 9i_3 = 6 \quad \text{--- } \textcircled{iii}$$

so, From  $\textcircled{i}, \textcircled{ii}, \textcircled{iii} \Rightarrow$

$$i_1 = 3A$$

$$i_2 = \frac{1}{2} = 0.5A$$

$$i_3 = \frac{5}{2} = 2.5A$$

$$V_1 = 2i_1 = 2 \times 3 = 6V$$

$$V_2 = 8i_2 = 8 \times 0.5 = 4V$$

$$V_3 = 9i_3 = 9 \times 2.5 = 10V$$

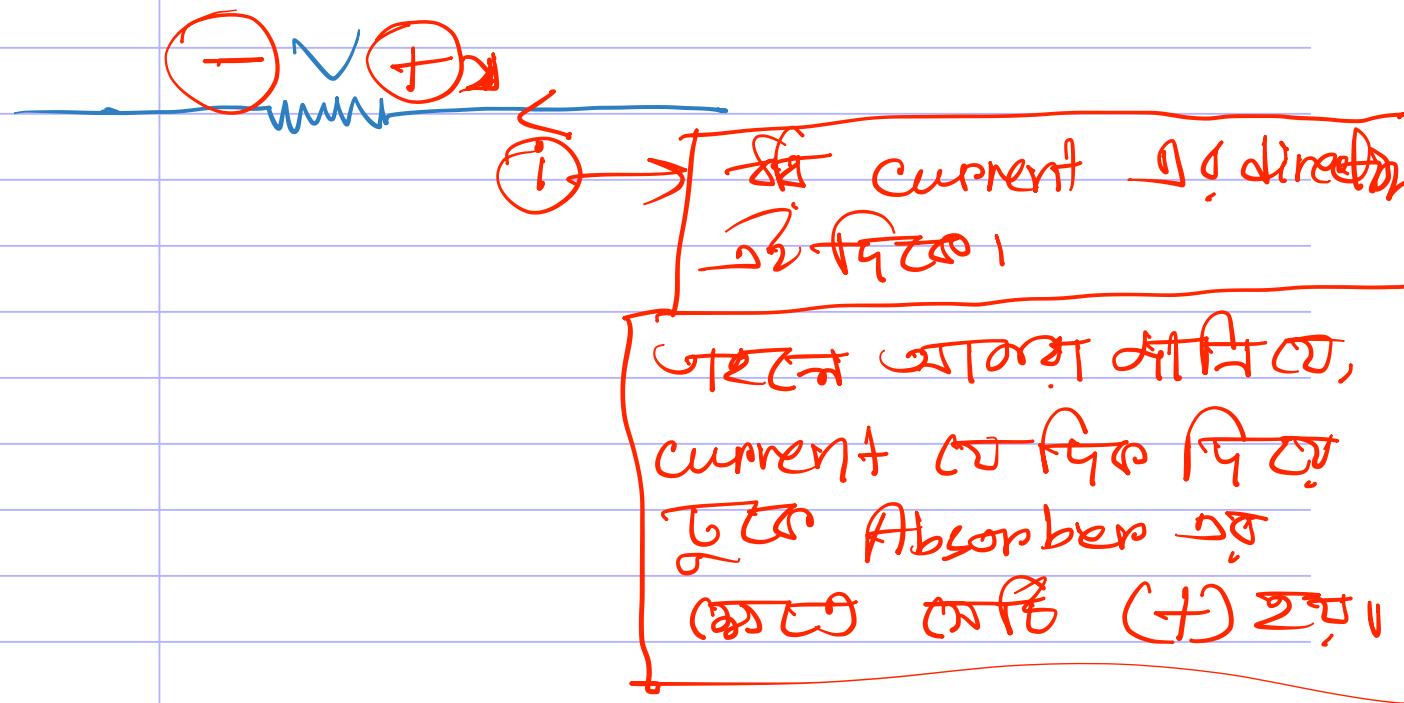
Ans

\* \* \* Question  $\rightarrow$  Voltage polarity এবং

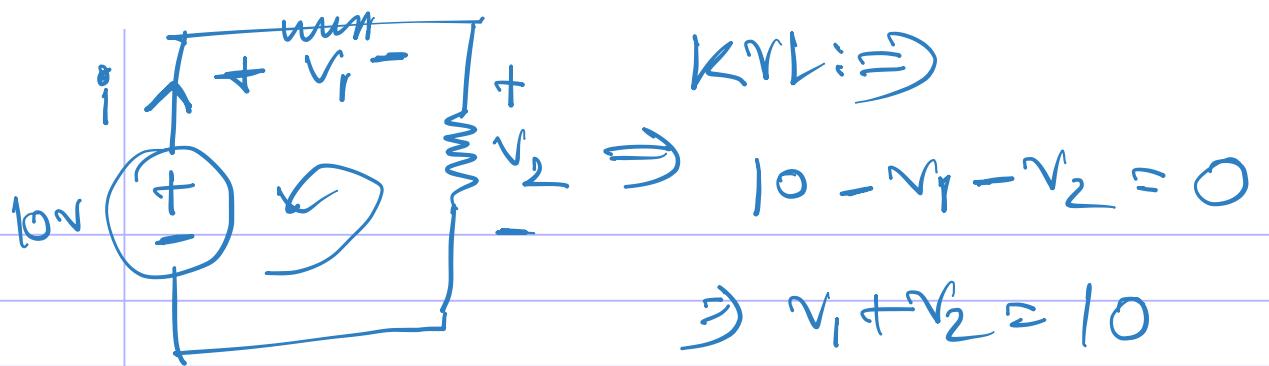
Current direction (দ্বারা তা ঘোষণা, নিষ্ঠা  
ইত্যুক্তি মতো Current direction নিব।

then  $\rightarrow$  direction এর সময় base করে  
voltage polarity (+, -) দিব।

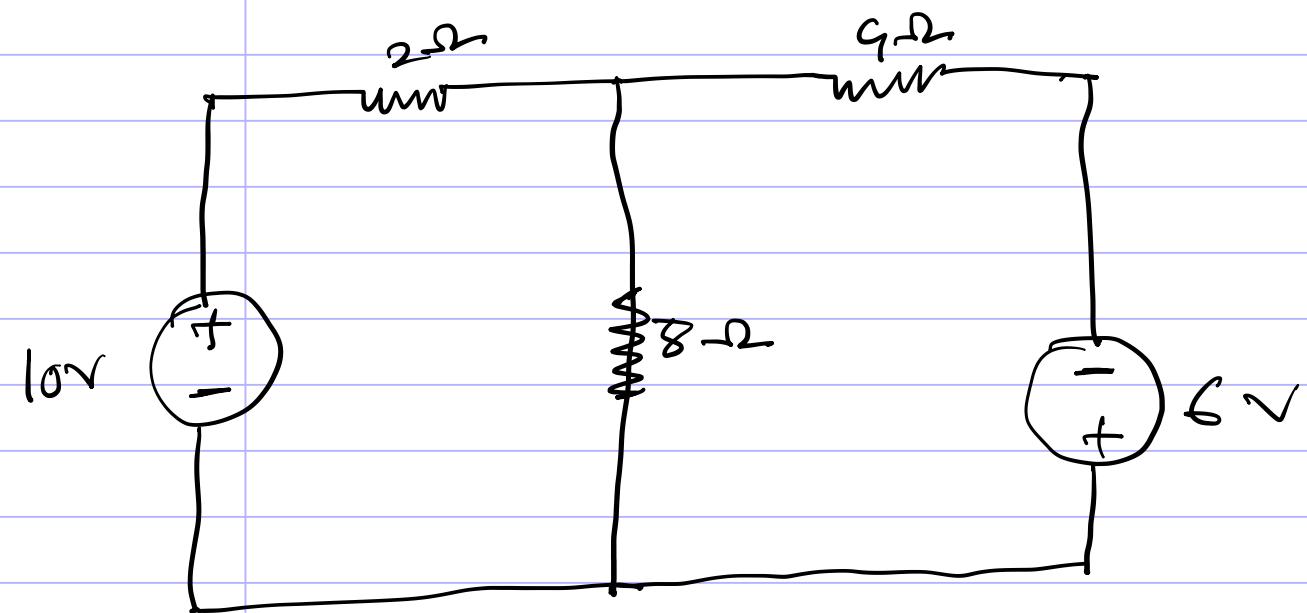
যোগান : -



কুৱে যোগান ক' sign  $\Rightarrow$  voltage এর  
যোগ কৰাবো !!



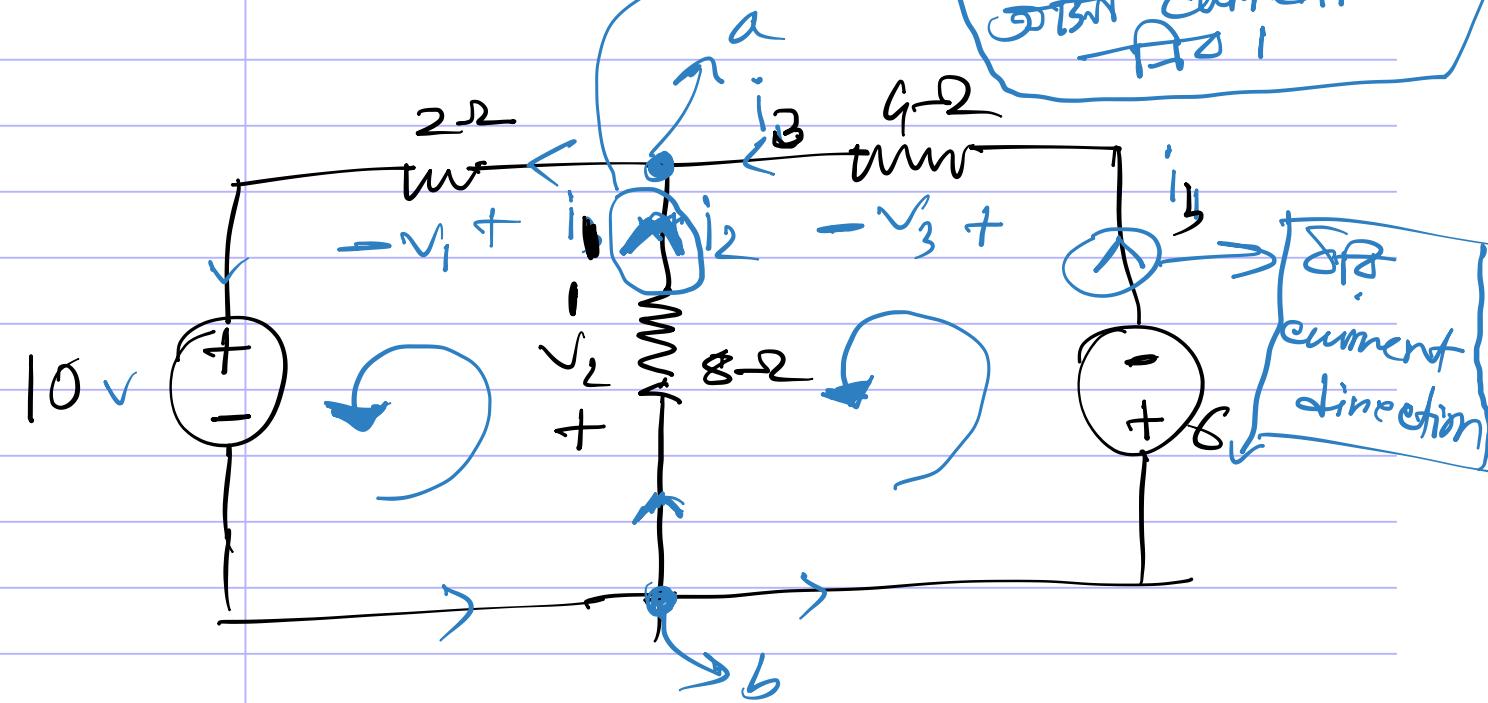
~~\* Now Let's solve a question which is without polarity and without current direction :-~~



~~\* Find the current and voltage.~~

Solution

SECRET  
 $10V > 6V \Rightarrow$  voltage  
 Source  $\text{out}$   $10V$  source  
 GND current to  
 A 1



$\rightarrow$  KCL at node a:

$$i_1 = i_2 + i_3$$

$$\Rightarrow i_1 - i_2 - i_3 = 0 \quad \textcircled{1}$$

Loop 1:

$$10 + v_2 + v_1 = 0$$

$$\Rightarrow 2i_1 + 8i_2 = -0 \quad \textcircled{i1}$$

Loop 2:

$$6 + v_3 - v_2 = 0$$

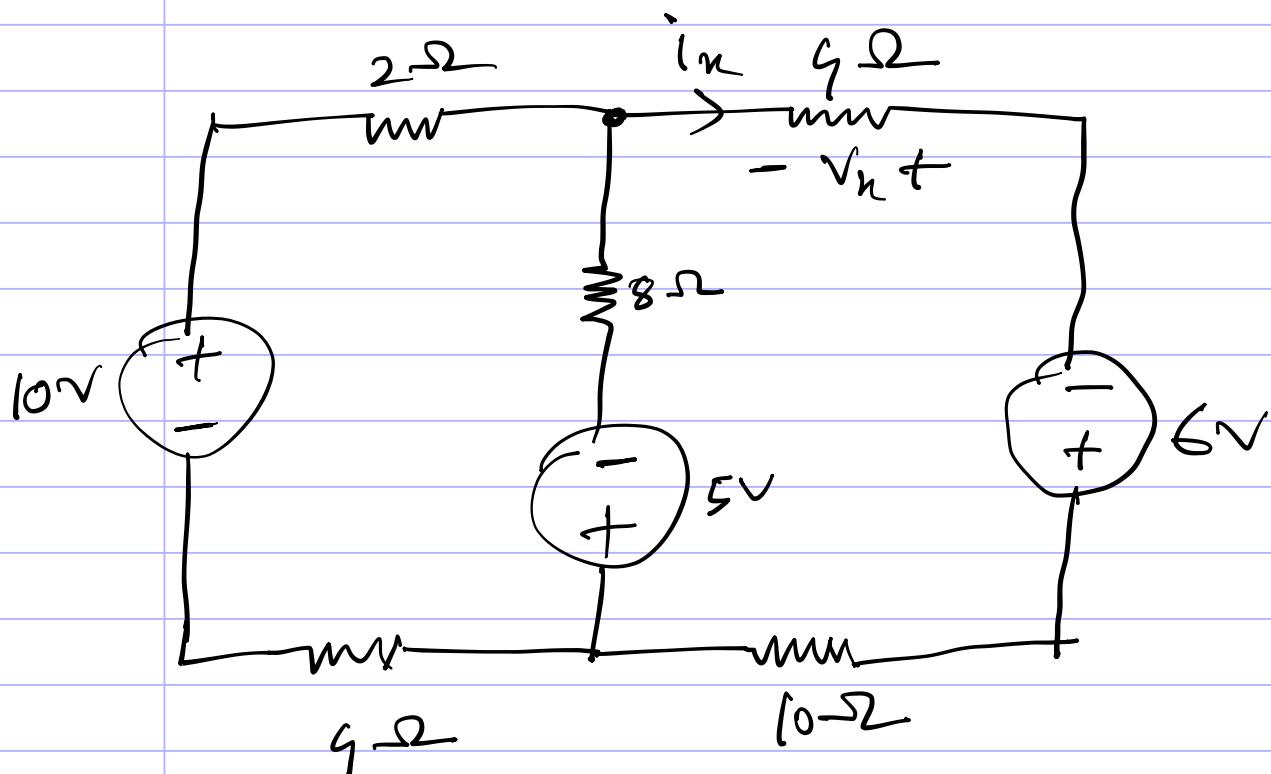
$$\Rightarrow 6 + 9i_3 - 8i_2 = 0$$

$$\Rightarrow -8i_2 + 9i_3 = -6 \quad \text{--- } iii$$

From  $i$ ,  $ii$  &  $iii$   $\Rightarrow$

$$\left. \begin{array}{l} i_1 = -3 \\ i_2 = -\frac{1}{2} \\ i_3 = -\frac{5}{2} \end{array} \right\} \quad \left. \begin{array}{l} V_1 = -3 \times R_1 \\ V_2 = -\frac{1}{2} \times R_2 \\ V_3 = -\frac{5}{2} \times R_3 \end{array} \right.$$

\* Question:

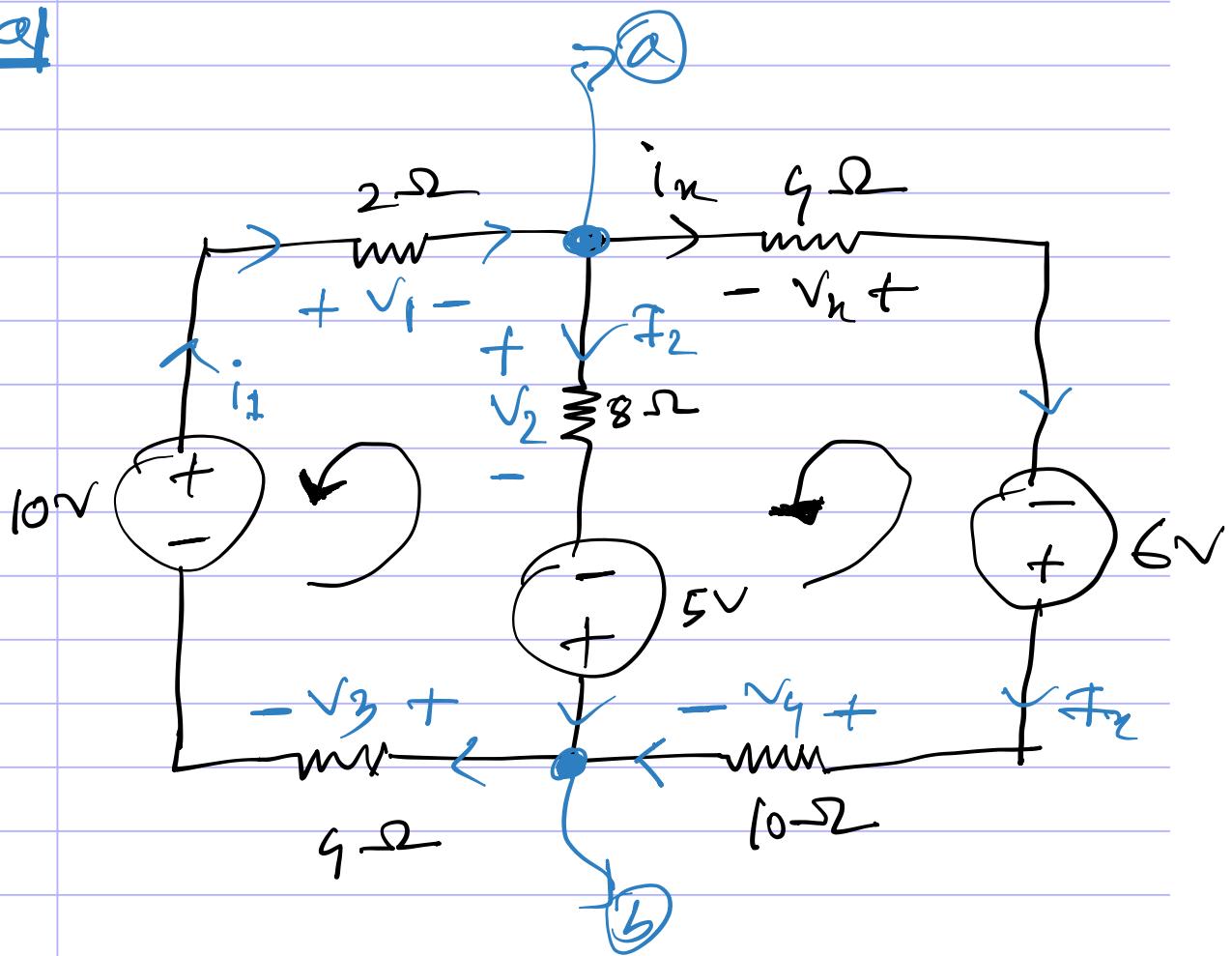


a) Determine  $i_n$  and  $V_{in}$ .

b) Determine which  $\uparrow$  sources are supplying power.

Solution

Q1



At node-a, using KCL L:

$$F_1 = F_n + F_2$$

$$\Rightarrow F_1 - F_2 - F_n = 0 \quad \text{--- (1)}$$

Loop 1: KVLL at Loop 1:

$$+10 - v_1 - v_2 - v_3 + 5 = 0$$

$$\Rightarrow V_1 + V_2 + V_3 = 15$$

$$\Rightarrow 2I_1 + 8I_2 + 9I_1 = 15$$

$$\Rightarrow 6I_1 + 8I_2 = 15$$

Loop 2: KVL out loop 2:

II

$$+V_n + V_2 - 5 - V_q + 6 = 0$$

$$\Rightarrow 1 = V_q - V_n - V_2$$

$$\Rightarrow 10 \cdot i_n - 9 \cdot i_n - 8 i_2 = 1$$

$$\Rightarrow 6i_n - 8i_2 = 1 \rightarrow \text{III}$$

By using I, II, III  $\Rightarrow$

$$i_1 = 1.65 A$$

$$i_2 = 0.69 A$$

$$i_n = 1.0 A$$

$$V_n = -I_n \times 9$$

$$= -(1 \times 9) = -9 V$$

Aus