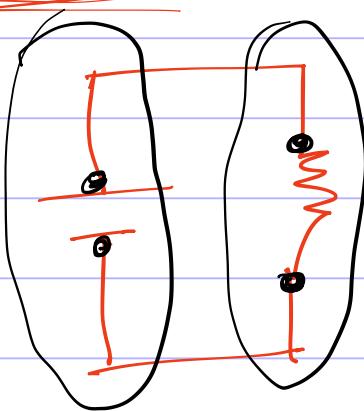


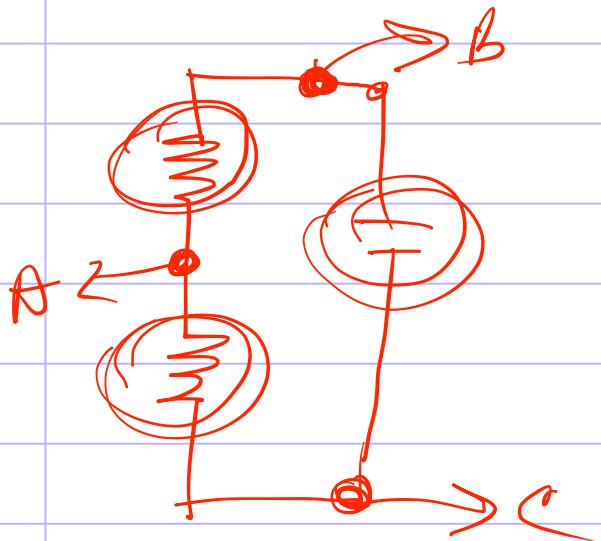
Lecture - 7

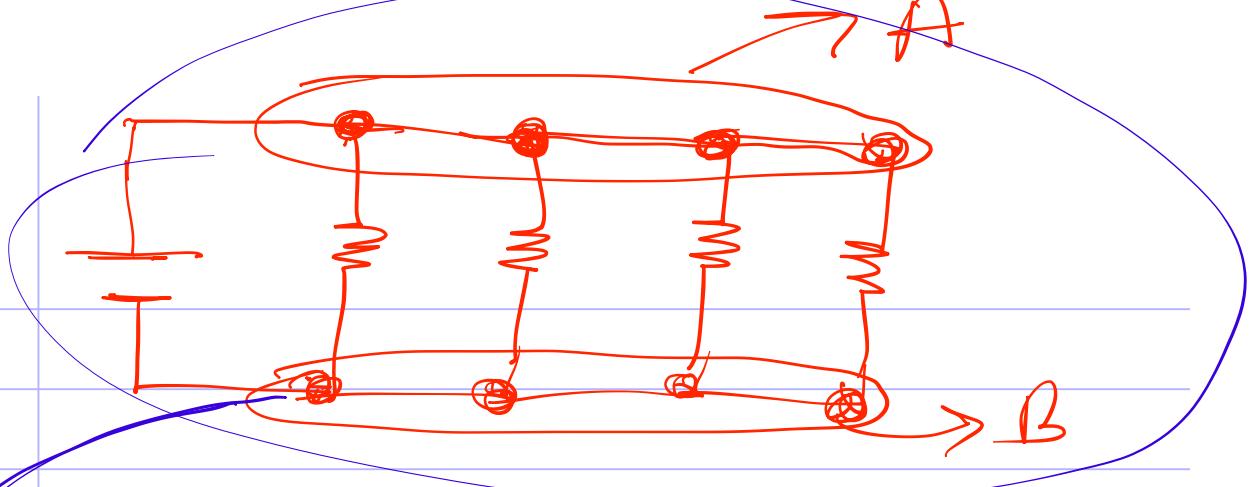
* Branch:



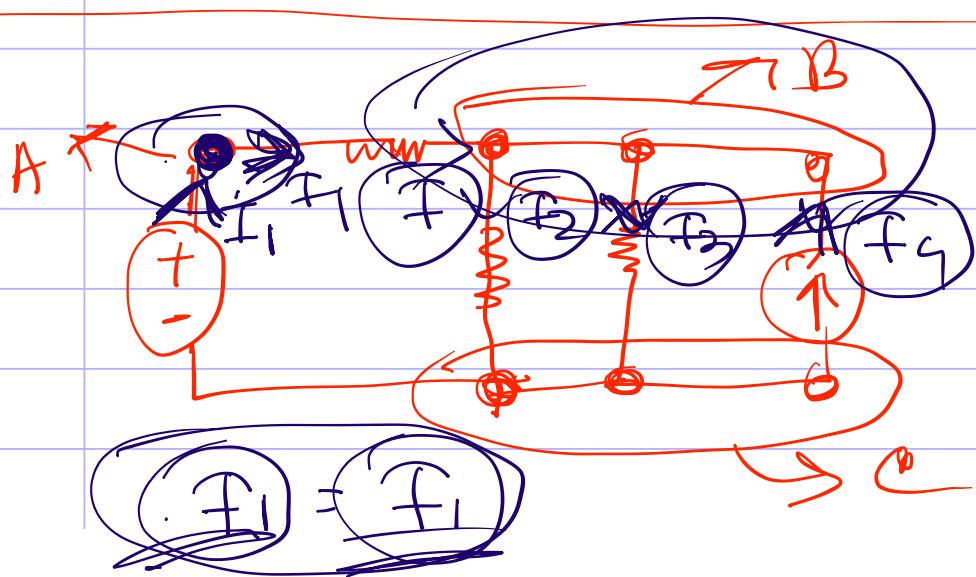
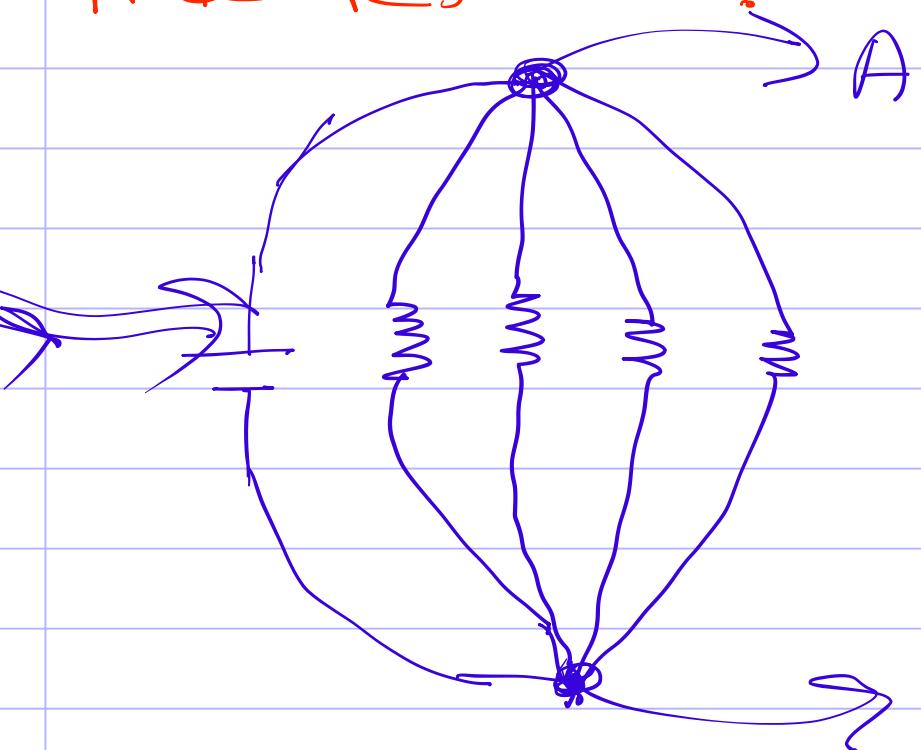
Solution

* A node is a junction of two or more branches.





कल्पना Node से इसका अर्थ
यह कल्पना की Single
Node होती है।



$$f_1 + f_2 = f_3$$

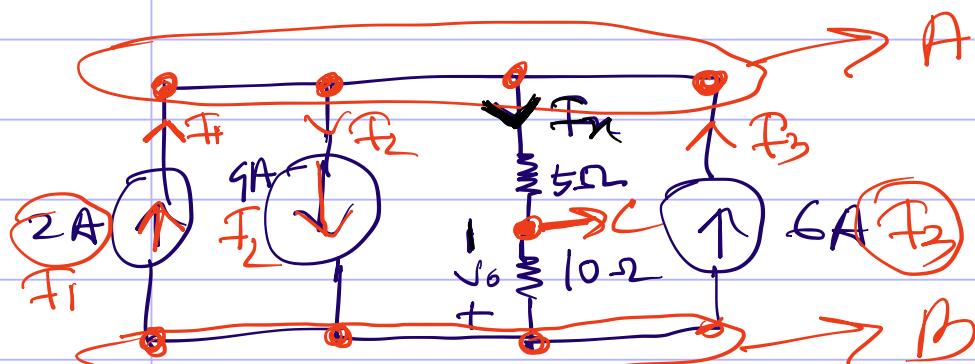
KCL

* একটি Node \rightarrow total ΣI
amount of current going out

for same amount of current goes
out

(ii) ২০ স্টায় at Node A

current divided ২০ স্টায়
at Node A into 2 parts



- (a) Determine F_R and V_0
- (b) Determine the power absorbed by each element.
- (c) Can you make this circuit more smaller?

Solution

at Node A -

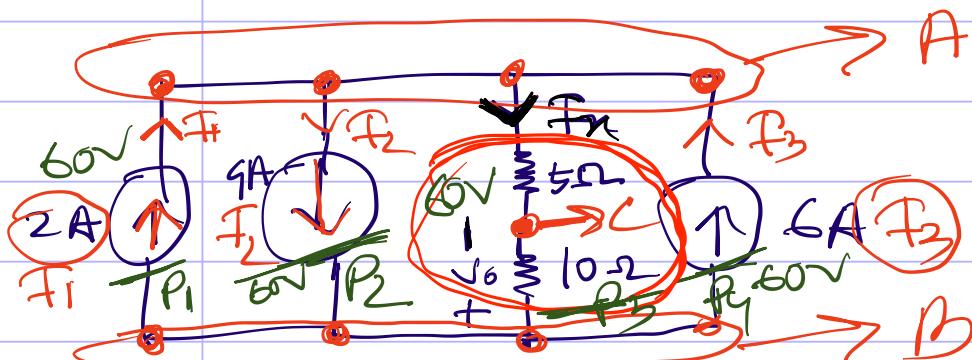
According to KCL:

$$\begin{aligned} F_1 + F_3 &= F_n + F_2 \\ \Rightarrow 2 + 6 &= F_n + 9 \\ \Rightarrow F_n &= 8 - 9 = 9 \text{ A} \end{aligned}$$

Ohm's Law:

$$V = IFR = -9 \times 10 = -90 \text{ V}$$

Aud



a) Determine F_n and V_o

b) Determine the power absorbed by each element.

c) Can you make this circuit more smaller?

$$P = \square V F = F \nabla P = \frac{V}{R}$$

b1 we know that,
 parallel circuit \rightarrow voltage
 short Ω ,

$$R = R_1 + R_2 = 5\Omega + 10\Omega$$

$$= 15\Omega$$

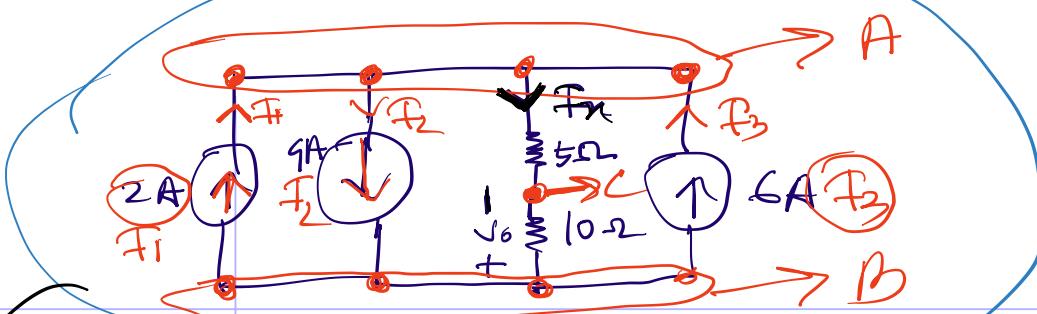
$$V = \square V F = +9 \times 15 \\ = +60V$$

$$\cancel{*} \Rightarrow P_1 = -V F = -60 \times 2 = -120W$$

$$\Rightarrow P_2 = +V F = +60 \times 9 = 240W$$

$$\Rightarrow P_3 = +V F = +60 \times 4 = 240W$$

$$\Rightarrow P_4 = -V F = -60 \times 6 = -360W$$



a) Determine F_x and V_0

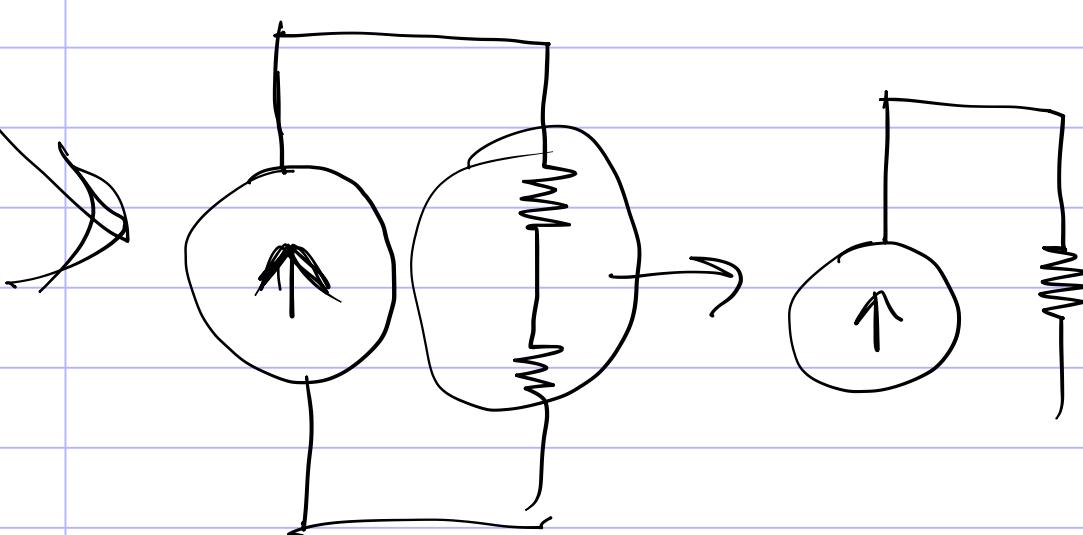
b) Determine the power absorbed by each element.

c) Can you make this circuit more smaller?

Solution

Note: Always current source ~~parallel~~ \rightarrow ~~current~~ ~~current~~ ~~current~~

and current source series \rightarrow ~~current~~ ~~current~~ ~~current~~



(*) (i) ~~current~~ loop \Rightarrow ~~current~~ element \Rightarrow voltage \Rightarrow total always zero

KVL Rule

1) ~~প্রযোজনীয়~~ Branch এ suitable current এর direction দেওয়া হবে।
[যদি question এ দেয়া নাহিলে]

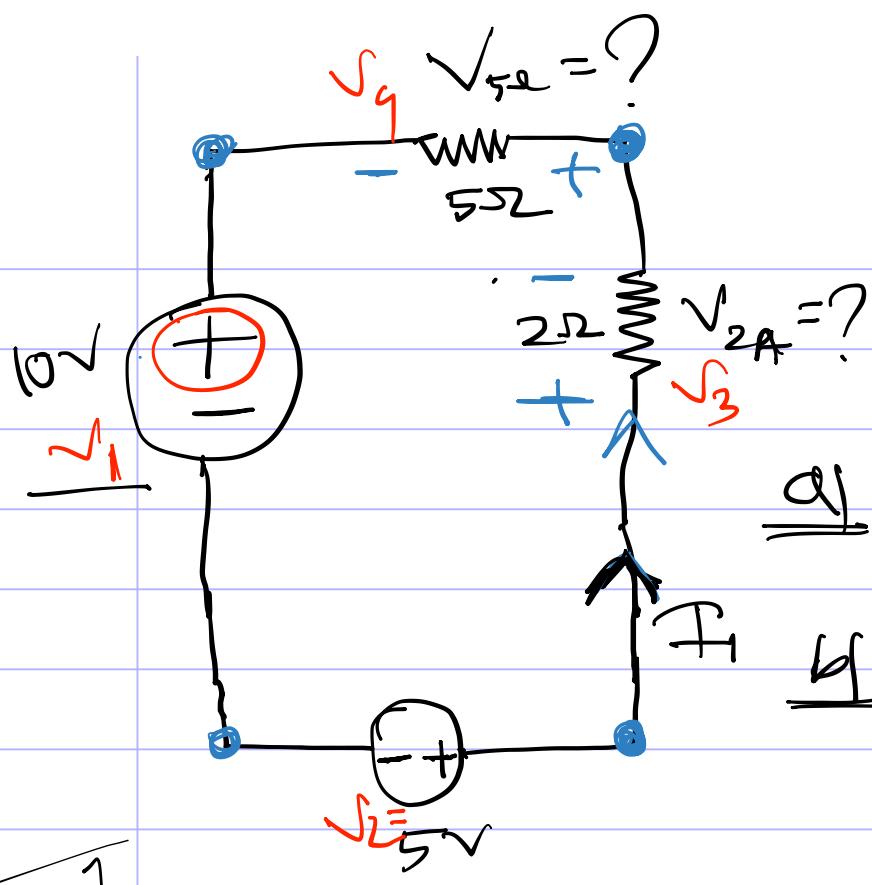
2) ~~প্রযোজনীয়~~ Nodes এর terminal রেখ বর্ণনা করবে।

3) ~~প্রযোজনীয়~~ element এ proper voltage polarity (+, -) assign করবে।

4) Apply KVL rule.



[Note: KVL এর ক্ষেত্রে Always
smallest loop করলে use
বর্ণনা।]



a) Determine I_1

$$I_1 = ? \quad V_{R2}, V_{R3} = ?$$

$$V = IR$$

Solution

$$+V_1 - V_2 + V_3 + V_4 = 0$$

$$+10 - 5 + V_3 + V_4 = 0$$

$$5 + I_1 R_3 + I_1 R_4 = 0$$

$$5 + 2I_1 + 5I_1 = 0$$

$$5 + 7I_1 = 0$$

$$I_1 = -\frac{5}{7} \quad \textcircled{A}$$

$$\underline{6} \quad V_{22} = F_1 \times 2 - 2 = -\frac{5}{7} \times 2$$

$$V_{52} = -\frac{5}{7} \times 5$$

Ans