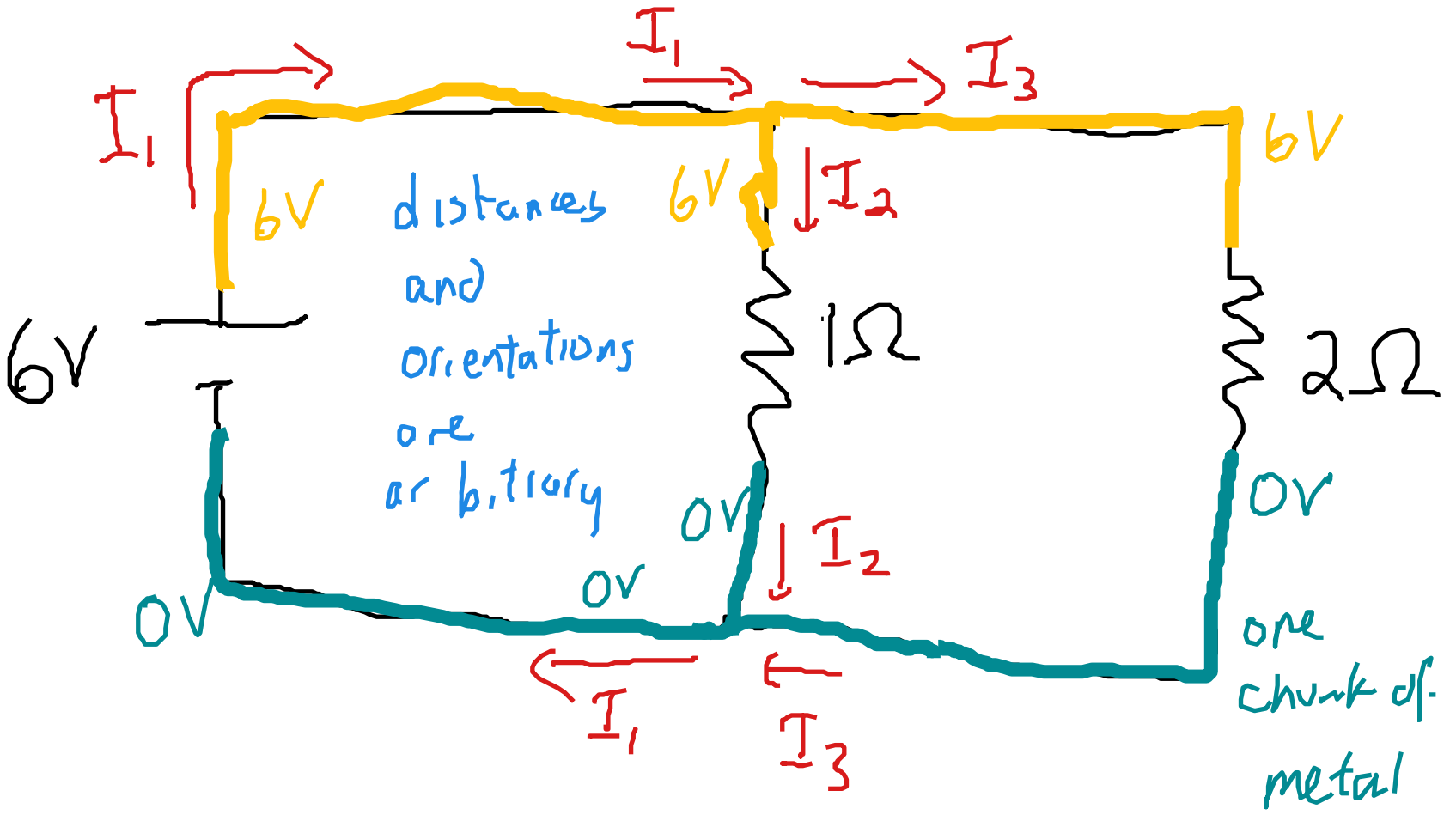


Junction

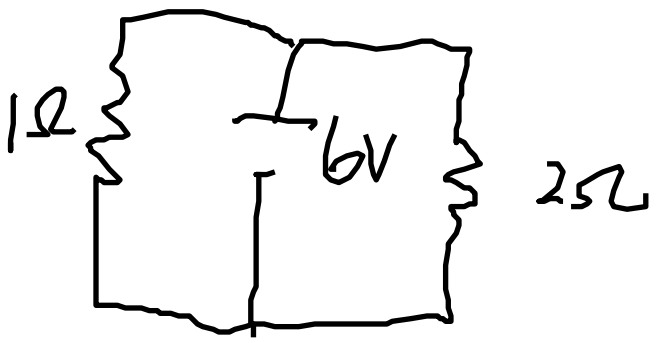
I_1 in → out → I_3

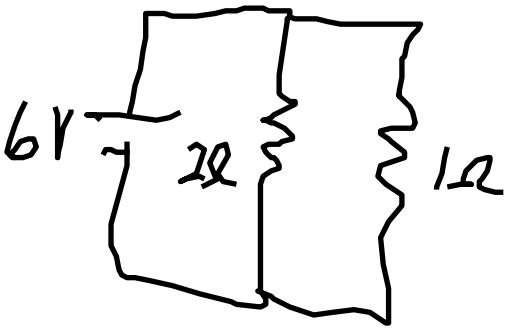
out ↓ I_2

Current in = Current out

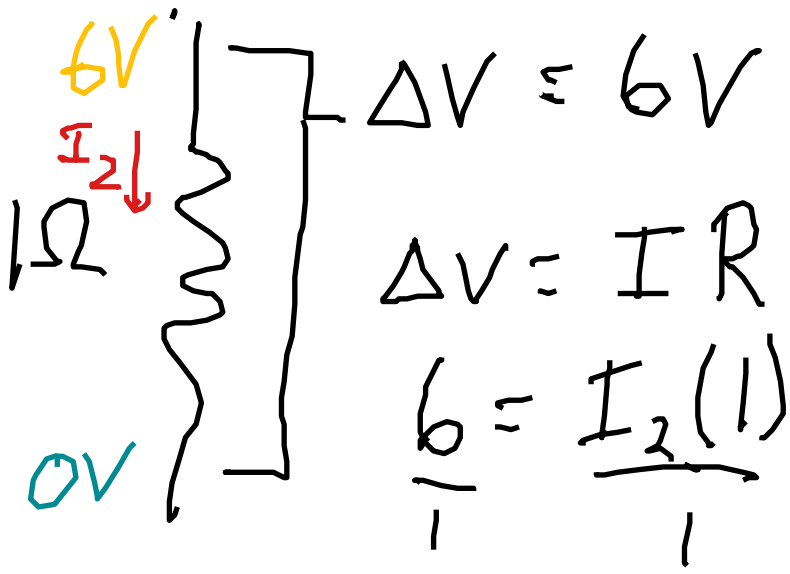
(steady current)

In this case $I_1 = I_2 + I_3$





All equivalent circuits to the one above,

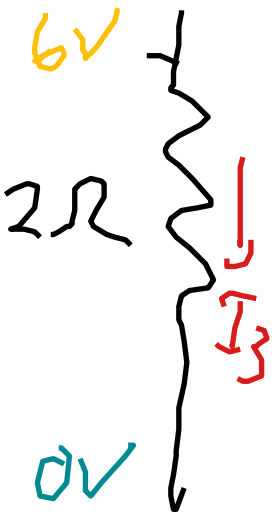


$\Delta V = 6V$

$\Delta V = IR$

$\frac{6}{1} = \frac{I_2(1)}{1}$

$\Rightarrow I_2 = 6A$



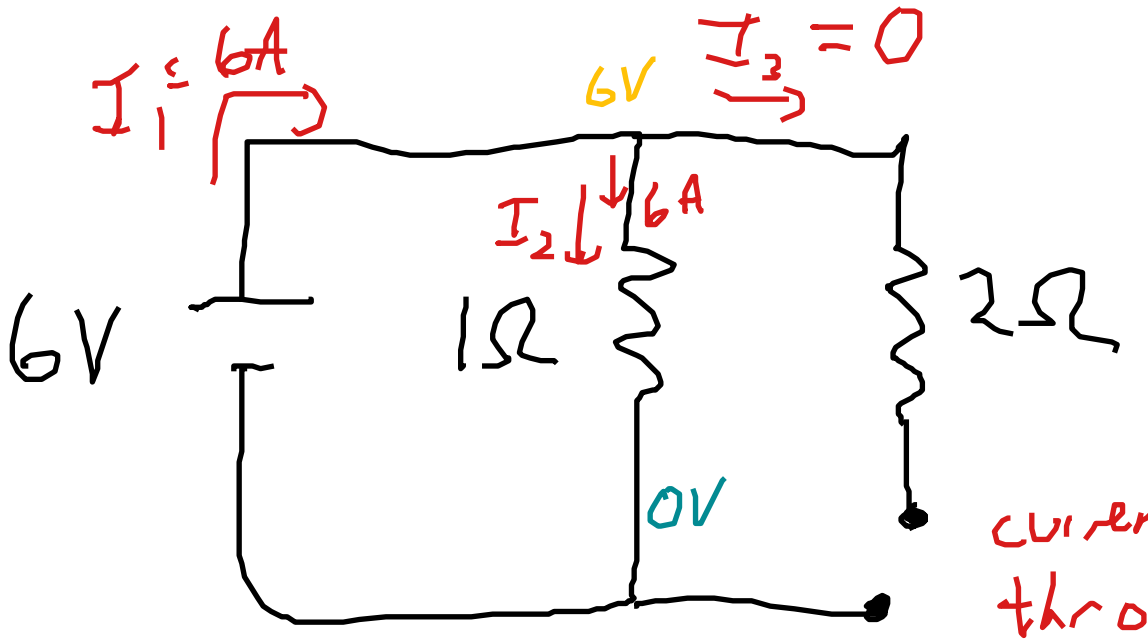
$\Delta V = 6V$

$\Delta V = IR$

$6 = I_3(2)$

$\rightarrow I_3 = 3A$

$I_1 = I_2 + I_3 = 6A + 3A = 9A$



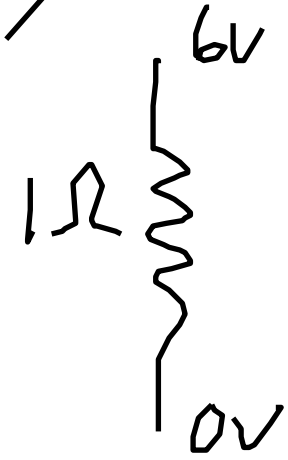
What happens to the current through the 1Ω resistor?

A) gets bigger (than 6A)

B) stays same

C) gets smaller

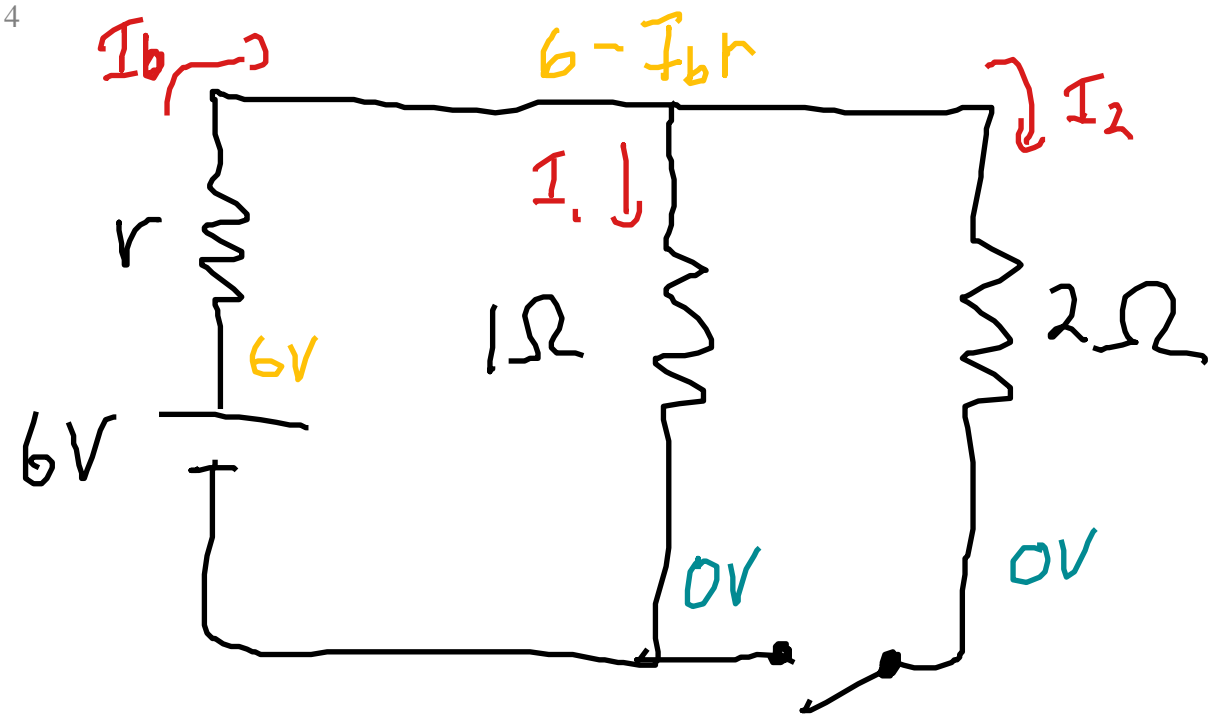
D) stops (0A)



$\Delta V = IR$

$6 = I_2 (1)$

$I_2 = 6A$



r: internal resistance of power supply

ΔV across the internal resistance

is $I_b r$

Remove the 2Ω resistor (open switch)

- then battery supplies less current (intuition)
- then $6 - I_b r$ gets bigger (smaller)
- ΔV across 1Ω is bigger
- I_1 is bigger

r is typically small

- If all other resistances in problem are much bigger than r, then we can ignore it.

- High-power devices have low resistance maybe less than r?

- High-power devices can dim lights