



समस्त बिहार, भरेगा हुंकार

# HUNKAR 2025

में आपका स्वागत है



# HUNKAR 2025



VIDYAKUL



# PHYSICS

**JP UJALA Sir**



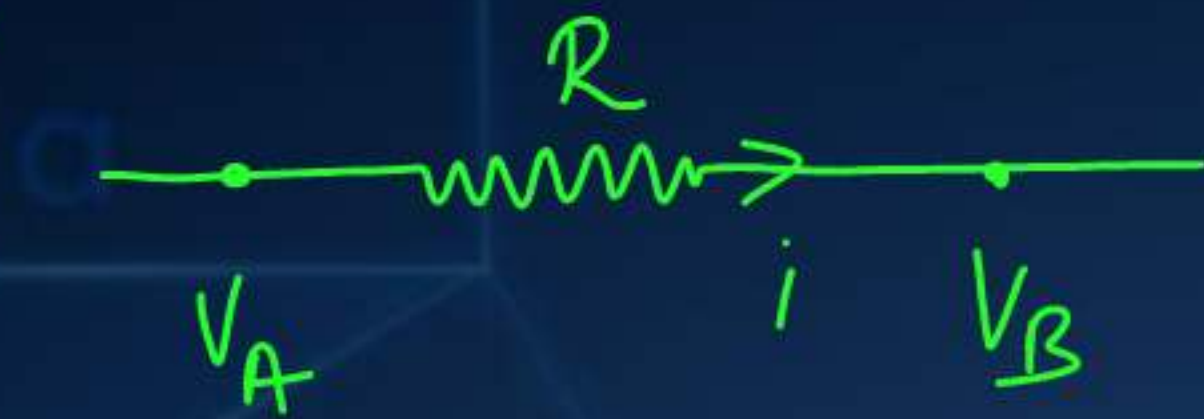
# अध्याय 03

*Combination of cells.*

आज का टॉपिक



\* ①



$$V_A - V_B = iR$$

$$V_A - iR = V_B$$

(ii)



$$V_B - V_A = iR$$

$$V_B = V_A + iR$$

$$V_A + iR = V_B$$

Use:

①



$$V_A - iR_1 - iR_2 - iR_3 = V_B$$

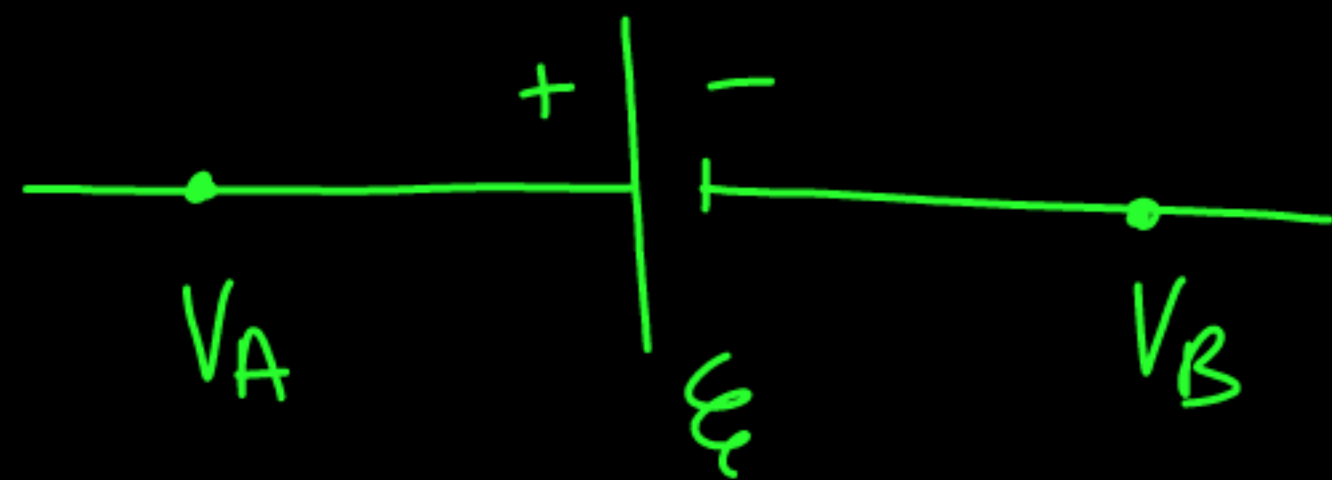
②



$$V_A + iR_1 + iR_2 = V_B$$

\* cell

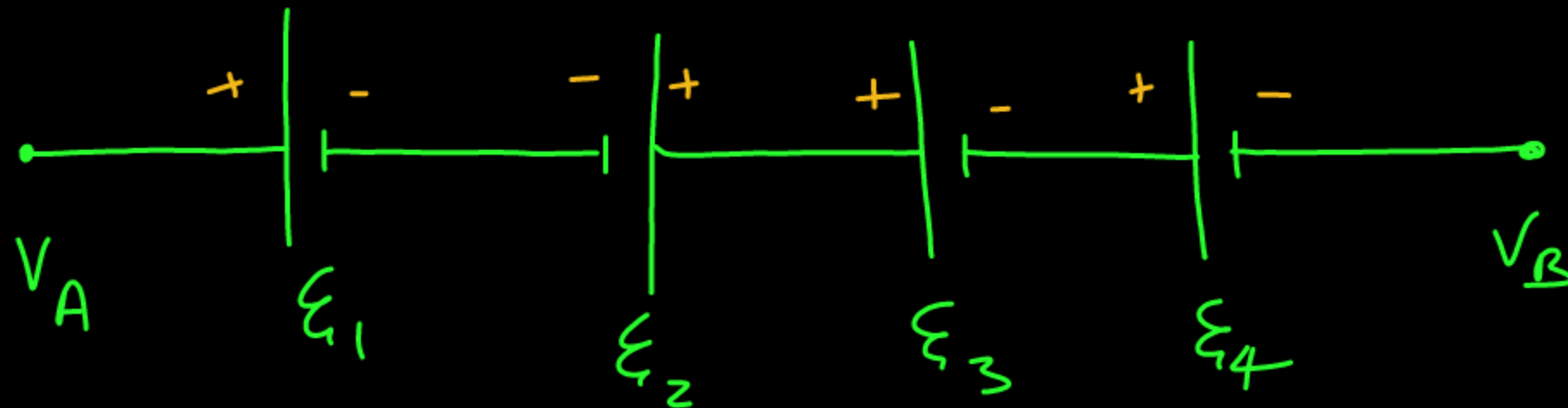
①



$$V_A - V_B = \epsilon$$

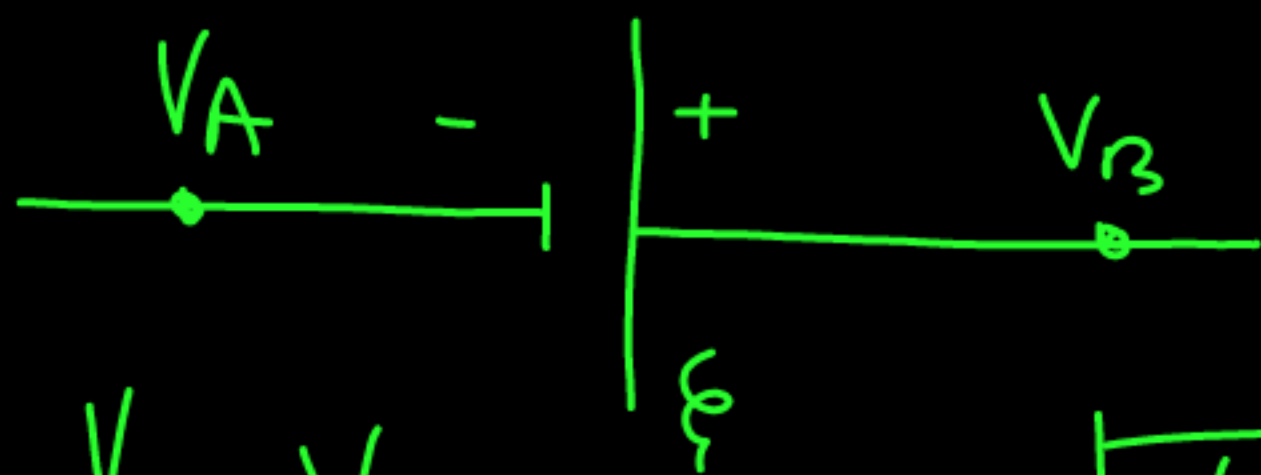
$$V_A - \epsilon = V_B$$

\* Use



$$V_A - \epsilon_1 + \epsilon_2 - \epsilon_3 - \epsilon_4 = V_B$$

②



$$V_B - V_A = \epsilon$$

$$V_B = V_A + \epsilon$$

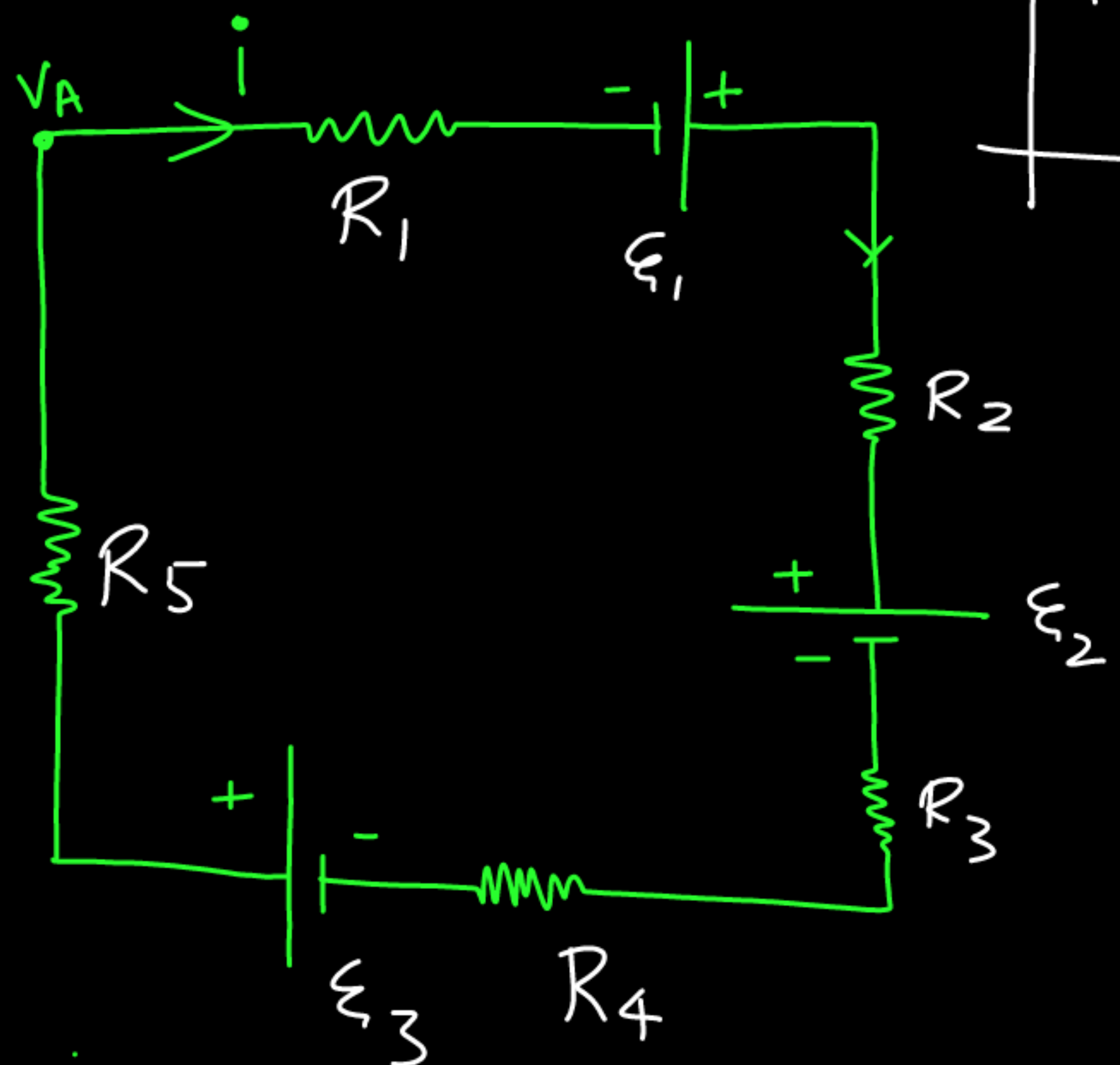
$$V_A + \epsilon = V_B$$



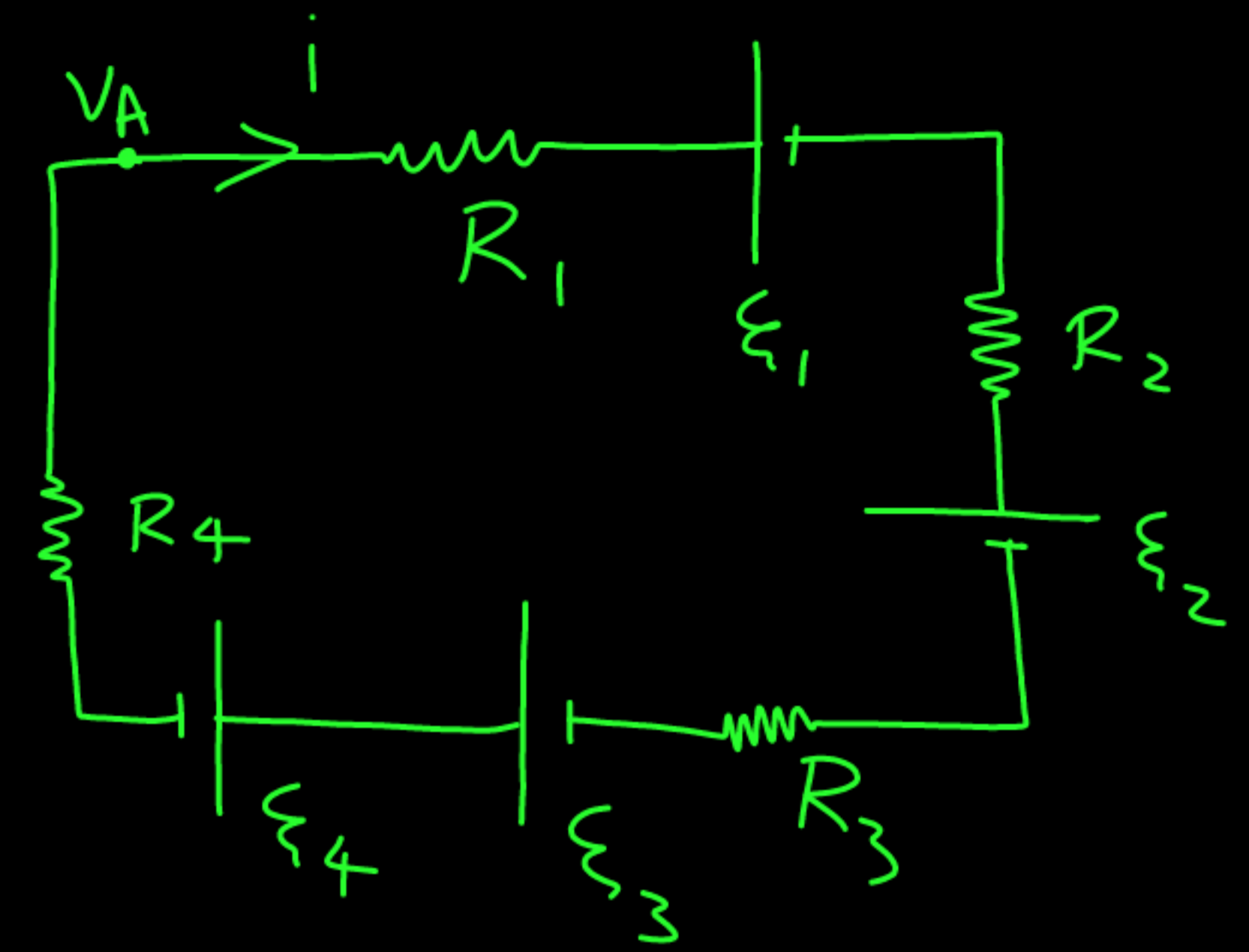
⊗ Example

Use of Kirzchhoff's Law.

$$i = \frac{\xi_1 - \xi_2 + \xi_3}{R_1 + R_2 + R_3 + R_4 + R_5}$$



(HW)



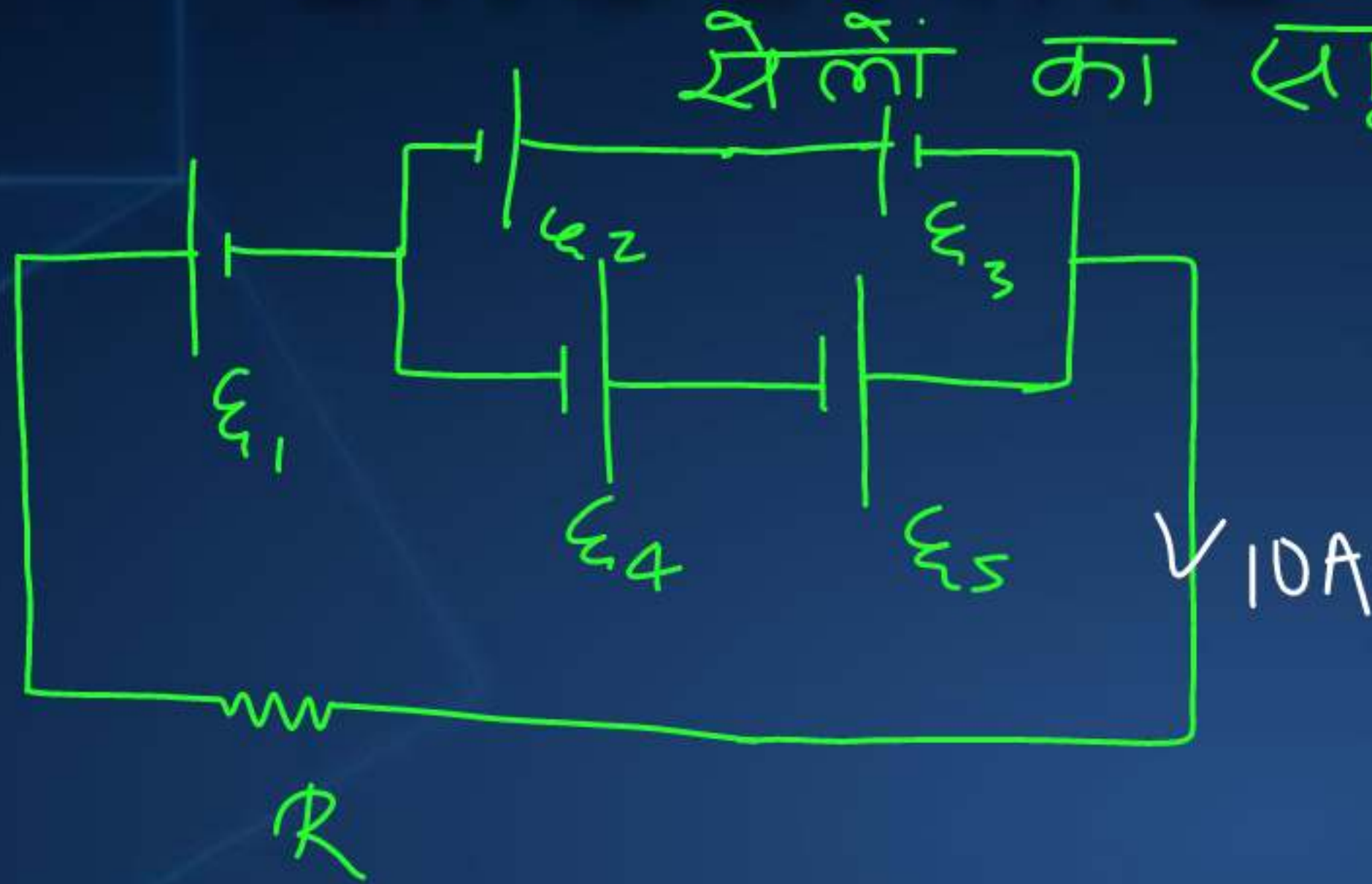
~~$$V_A - iR_1 + \xi_1 - iR_2 - \xi_2 - iR_3 - iR_4 + \xi_3 - iR_5 = V_A$$~~

$$\xi_1 - \xi_2 + \xi_3 = i(R_1 + R_2 + R_3 + R_4 + R_5)$$



# GROUPING OF CELLS

(\*)



If number of cells connected in one circuit then it is called grouping of cells.

यदि किसी परिपथ में बहुत सारे सेल जुड़े हों तो इसे सेलों का समूह कहते हैं।



# EQUIVALENT EMF OF CELLS

\* If Number of cells replaced by one cell & it produces same current then it is called equivalent cell & its emf is called equivalent emf.

यदि बहुत से सेल को हटाकर एक सेल लगाया जाय और वह उसी ही धारा उत्पन्न करे जिना सभी मिलकर करते थे तो ऐसे सेल को समतुल्य सेल कहते हैं और इसके वि. वा. बल को समतुल्य  $E$  emf कहते हैं



# SERIES COMBINATION OF CELLS

श्रेणी का अर्थ क्रम एक साथ

① Same direction

\* ideal cell



$$V_A + \epsilon_1 + \epsilon_2 + \epsilon_3 + \epsilon_4 = V_B$$

$$V_A + \epsilon_{eq} = V_B$$

$$\epsilon_{eq} = \epsilon_1 + \epsilon_2 + \epsilon_3 + \epsilon_4$$

② opposite direction



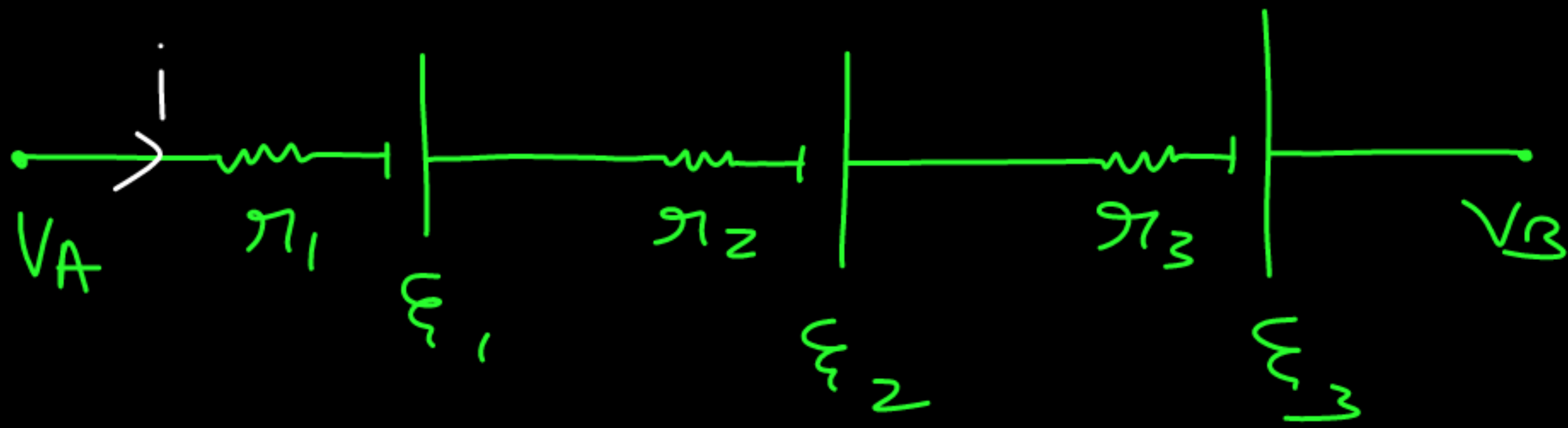
$$V_A + \epsilon_1 + \epsilon_2 + \epsilon_3 - \epsilon_4 - \epsilon_5 = V_B$$

$$\epsilon_{eq} = \epsilon_1 + \epsilon_2 + \epsilon_3 - \epsilon_4 - \epsilon_5$$



\* Non ideal cell अनादिश रैम:

① Same direction



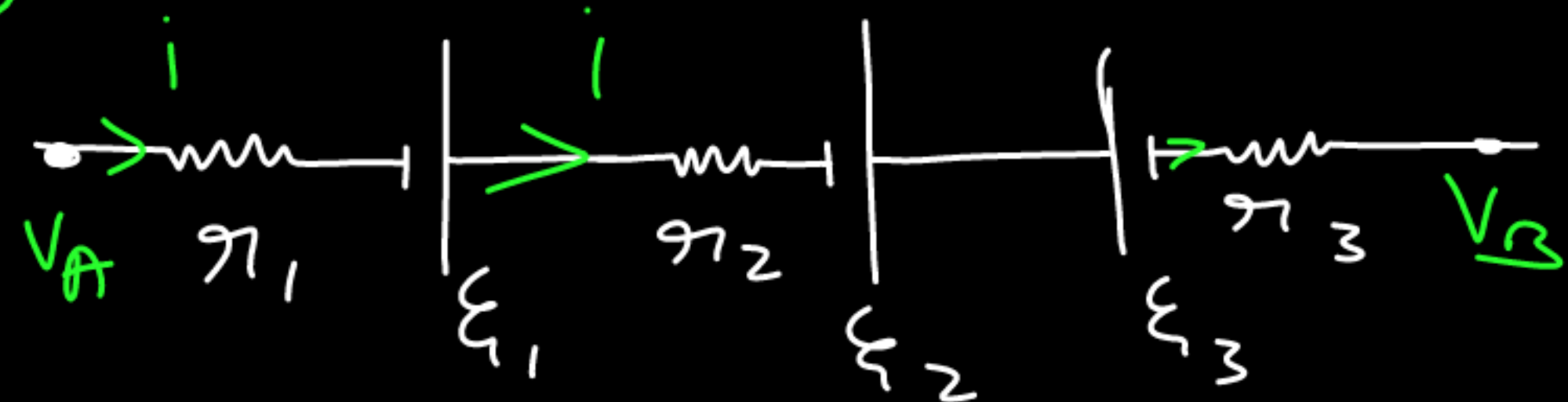
$$V_A - i r_1 + \epsilon_1 - i r_2 + \epsilon_2 - i r_3 + \epsilon_3 = V_B$$

$$V_A - i(r_1 + r_2 + r_3) + (\epsilon_1 + \epsilon_2 + \epsilon_3) = V_B$$

$$r_{eq} = r_1 + r_2 + r_3$$

$$\epsilon_{eq} = \epsilon_1 + \epsilon_2 + \epsilon_3$$

②



$$V_A - i r_1 + \epsilon_1 - i r_2 + \epsilon_2 - \epsilon_3 - i r_3 = V_B$$

$$V_A - i(r_1 + r_2 + r_3) + (\epsilon_1 + \epsilon_2 - \epsilon_3) = V_B$$

$$r_{eq} = r_1 + r_2 + r_3$$

$$\epsilon_{eq} = \epsilon_1 + \epsilon_2 - \epsilon_3$$