

# KCL: Kirchof Current Rule

$$i_1 + i_2 + i_3 = 0$$

$$i_2 R_2 = i_3 R_3 = i_6 R_6$$

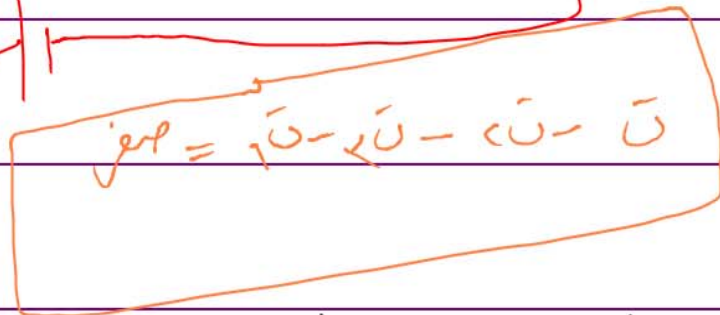
$$\sum i_k = 0$$

$$V = iR$$

$$G_j = \frac{1}{R_j}$$

$$i = \frac{U}{R}$$

$$i_k = \left( \frac{G_k}{\sum G_j} \right) i$$



$$G_2 = \frac{1}{R_2}, \quad G_3 = \frac{1}{R_3}, \quad G_6 = \frac{1}{R_6}$$

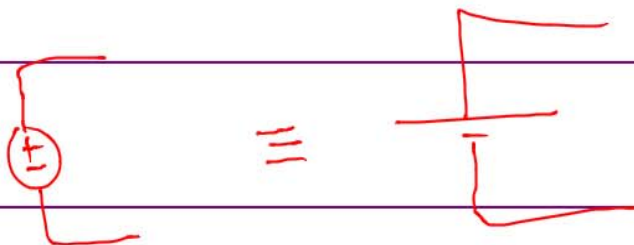
$$i_6 = i_{236} = \frac{G_{236}}{G_2 + G_3 + G_6} i$$

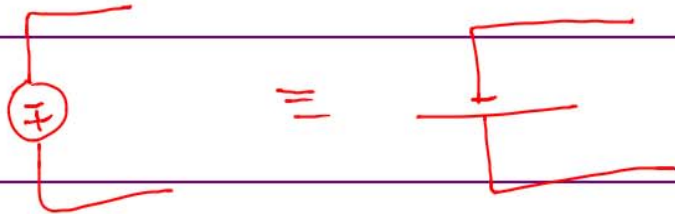
$$mho = \frac{1}{\Omega}$$

$$i_3 = \left( \frac{G_3}{G_2 + G_3 + G_6} \right) i$$

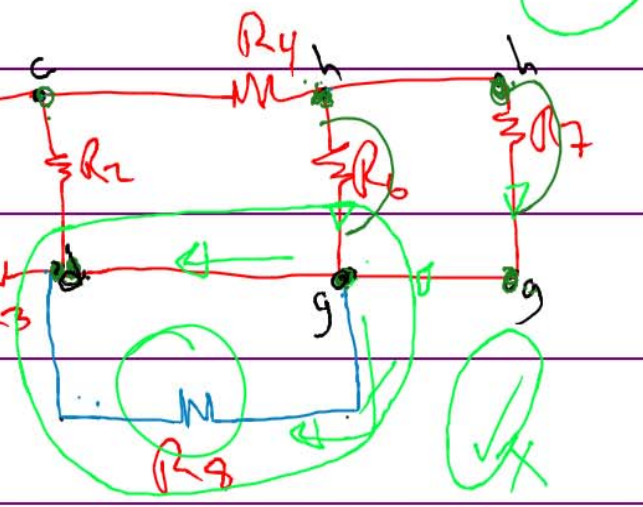
$$[R] = \frac{ohm}{\Omega}$$

# KVL: Kirchof voltage law





$$V_{ch} \equiv V_c - V_h$$



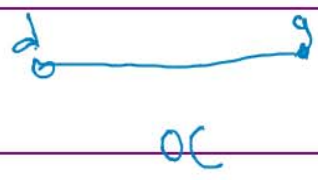
$s = d$

$$V_{ch} \equiv V_c - V_h = 4 \text{ volt}$$

$$V_{hg} \equiv V_h - V_g = 2 \text{ volt}$$

$$V_{gd} \equiv V_g - V_d = 0 \text{ volt}$$

$$V_{db} + V_{ba} + V_{ac} + V_{ch} + V_{hg} + V_{gd} = 0$$



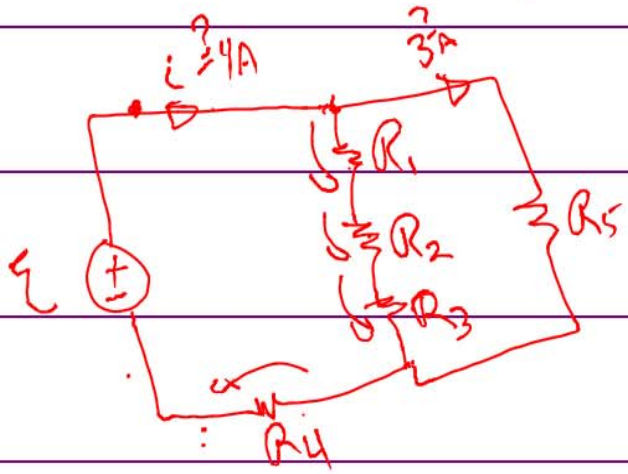
$$V_{ba} \equiv V_b - V_a = -10$$

$$V_{ab} \equiv V_a - V_b$$

$$V_{ch} + V_{hg} + V_{gd} + V_{dc} = 0$$

$$4 + 2 + 0 + V_{dc} = 0$$

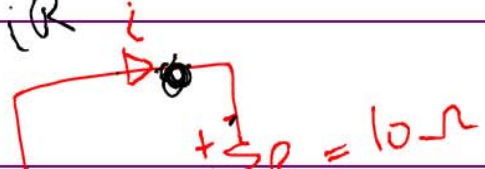
$$\therefore V_{dc} = -6 \text{ volt}$$



$$R_1 > R_2 > R_3 > R_4$$

$$P = i^2 R$$

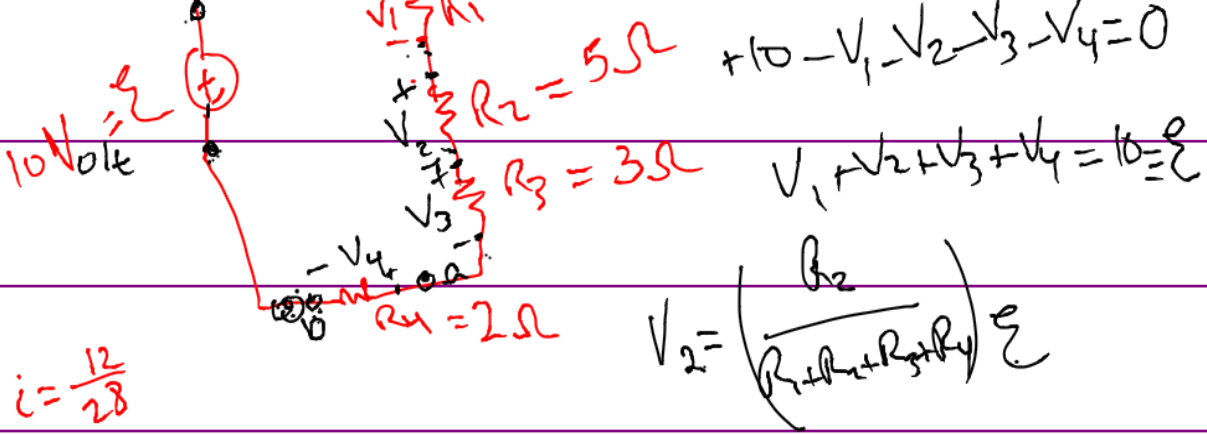
$$V = iR$$



$$V_1 > V_2 > V_3 > V_4$$

$$V_1 + V_2 + V_3 + V_4 = ? / 10 \text{ volt}$$

6V

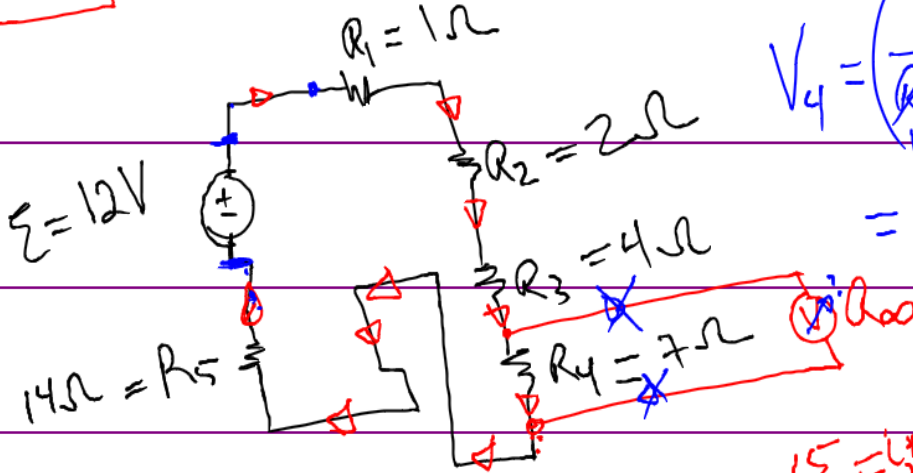


$i = \frac{12}{28}$



$V_4 = iR_4 = \frac{12}{28} * 7 = 3 \checkmark$

$V_4 = \left( \frac{R_4}{R_1 + R_2 + R_3 + R_4 + R_5} \right) \epsilon$   
 $= 3V$



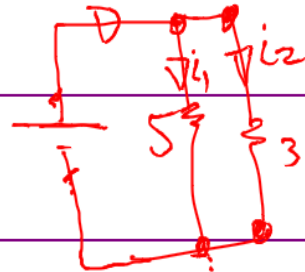
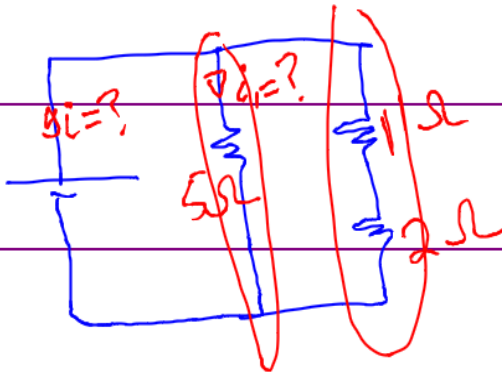
$iR = V$

$15 = i * 3 \Rightarrow i = 5$

$V = iR \Rightarrow i = 3$

$15 = i * 5$

$\epsilon = 15V$



KCL

$i_1 - i_2 = 0$   
 $15 = i_1 * 5$