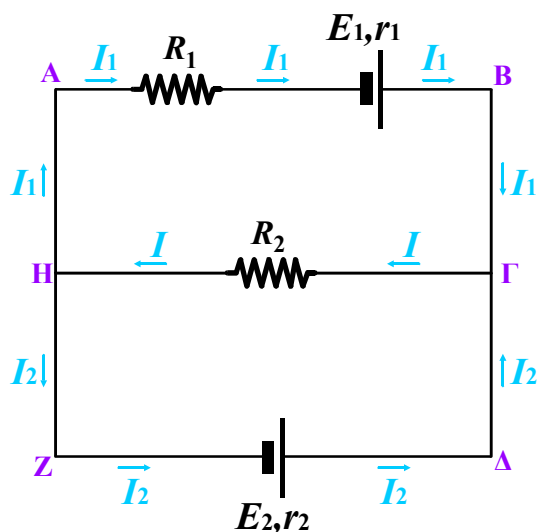
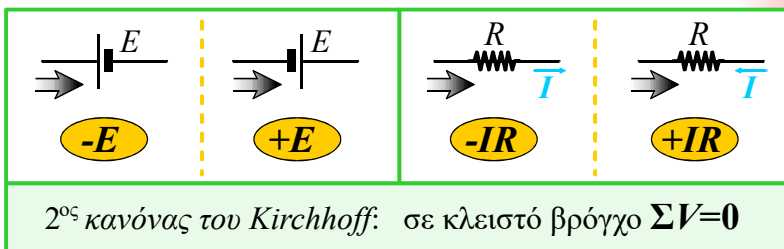


ΑΣΚΗΣΗ για τον 2^ο κανόνα του Kirchhoff

ΦΥΣΙΚΗ (γενικής παιδείας) Β' Λυκείου



$R_1 = 10 \, \Omega$	$R_2 = 40 \, \Omega$
$E_1 = 100 \, V$	$r_1 = 5 \, \Omega$
$E_2 = 50 \, V$	$r_2 = 10 \, \Omega$
$I_1 = ?, \, I_2 = ?, \, I = ?$	



1^{ος} κ. Kirchhoff (Γ): $I_1 + I_2 = I$ (1)

2^{ος} κ. Kirchhoff (ABΓHA): $-I_1 R_1 + E_1 - I_1 r_1 - I R_2 = 0 \Rightarrow -I_1 \cdot 10 + 100 - I_1 \cdot 5 - I \cdot 40 = 0 \Rightarrow$
 $\Rightarrow 100 = 15I_1 + 40I \Rightarrow 20 = 3I_1 + 8I$ (2)

2^{ος} κ. Kirchhoff (HΓΔZH): $+I R_2 - E_2 + I_2 r_2 = 0 \Rightarrow I \cdot 40 - 50 + I_2 \cdot 10 = 0 \Rightarrow$
 $\Rightarrow 40I + 10I_2 = 50 \Rightarrow 4I + I_2 = 5$ (3)

(3): $I_2 = 5 - 4I$
 (2): $I_1 = \frac{20 - 8I}{3}$
 $\xrightarrow{(1)} \frac{20 - 8I}{3} + 5 - 4I = I \Rightarrow 20 - 8I + 15 - 12I = 3I \Rightarrow 35 = 23I \Rightarrow I = \frac{35}{23} \, A$

(3): $I_2 = 5 - 4I = 5 - 4 \cdot \frac{35}{23} \Rightarrow I_2 = -\frac{25}{23} \, A$ με φορά αντίθετη απ' αυτήν που υποθέσαμε στο κύκλωμα

(2): $I_1 = \frac{20 - 8I}{3} = \frac{20 - 8 \cdot 35/23}{3} \Rightarrow I_1 = \frac{60}{23} \, A$

»check:

2^{ος} κ. Kirchhoff (ABΓΔΖΗΑ): $-I_1 R_1 + E_1 - I_1 r_1 - E_2 + I_2 r_2 = 0 \Rightarrow -\frac{60}{23} \cdot 10 + 100 - \frac{60}{23} \cdot 5 - 50 + (-\frac{25}{23}) \cdot 10 = 0 \Rightarrow$
 $\xrightarrow{\times 23} -600 + 2300 - 300 - 1150 - 250 = 0 \Rightarrow 0 = 0$