

ΑΠΑΝΤΗΣΕΙΣ

**ΠΑΝΕΛΛΑΔΙΚΕΣ ΕΞΕΤΑΣΕΙΣ Γ' ΤΑΞΗΣ
ΗΜΕΡΗΣΙΟΥ ΚΑΙ Δ' ΤΑΞΗΣ ΕΣΠΕΡΙΝΟΥ ΓΕΝΙΚΟΥ ΛΥΚΕΙΟΥ
- ΠΑΡΑΣΚΕΥΗ 6 ΙΟΥΝΙΟΥ 2014 -
ΕΞΕΤΑΖΟΜΕΝΟ ΜΑΘΗΜΑ: ΗΛΕΚΤΡΟΛΟΓΙΑ ΤΕΧΝΟΛΟΓΙΚΗΣ
ΚΑΤΕΥΘΥΝΣΗΣ (ΚΥΚΛΟΣ ΤΕΧΝΟΛΟΓΙΑΣ & ΠΑΡΑΓΩΓΗΣ)**

A1.

A1.1. δ

A1.2. α

A1.3. β

A1.4. α

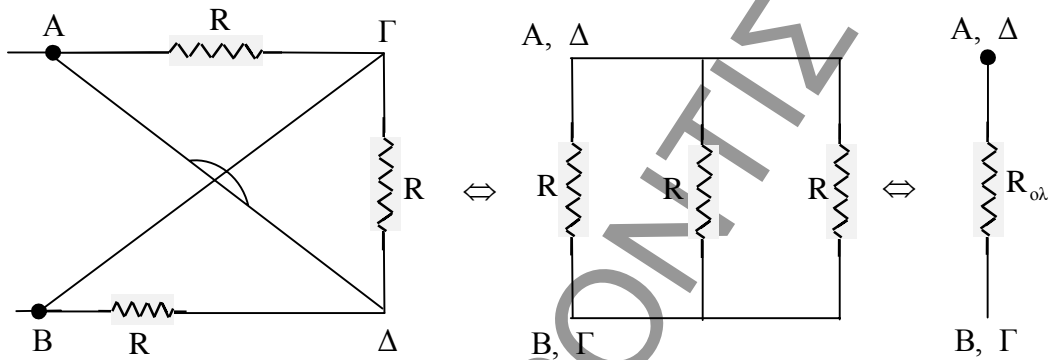
A2. $(9A)_{16} \rightarrow (154)_{10} \rightarrow (10011010)_2$

A3. $f = (x \cdot y) + z$

x	y	z	$x \cdot y$	$f = (x \cdot y) + z$
0	0	0	0	0
1	0	0	0	0
0	1	0	0	0
1	1	0	1	1
0	0	1	0	1

1	0	1	0	1
0	1	1	0	1
1	1	1	1	1

A4.



$$\frac{1}{R_{\text{ολ}}} = \frac{1}{R} + \frac{1}{R} + \frac{1}{R} = \frac{3}{R}$$

$$R_{\text{ολ}} = \frac{R}{3} = 4\Omega$$

A5. $\beta = \frac{\Delta I_C}{\Delta I_B}$, όταν $V_{CE} = \text{σταθερή}$

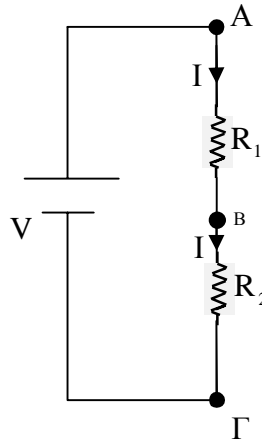
$$\beta = \frac{\Delta I_C}{\Delta I_B} \Rightarrow \beta = \frac{(5-4)10^{-3}}{(100-80)10^{-6}} \Rightarrow \beta = 50$$

B1.

$$\alpha) I = \frac{V}{R_1 + R_2} = \frac{72}{9} = 8A$$

$$V_{AB} = IR_1 \Rightarrow V_{AB} = 48V$$

$$V_{B\Gamma} = IR_2 \Rightarrow V_{B\Gamma} = 24V$$



$$\beta) I_{\Sigma} = \frac{P_{\Sigma}}{V_{\Sigma}} = 4A$$

$$R_{\Sigma} = \frac{V_{\Sigma}}{I_{\Sigma}} = 6\Omega$$

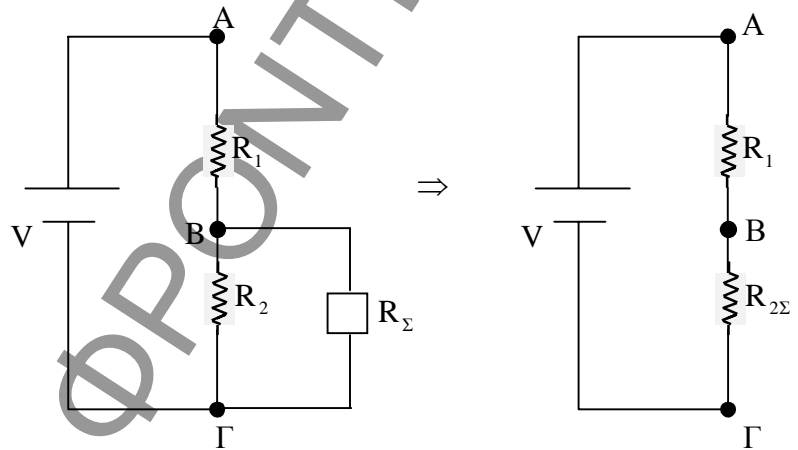
$$R_{2\Sigma} = \frac{R_2 R_{\Sigma}}{R_2 + R_{\Sigma}} \Rightarrow R_{2\Sigma} = 2\Omega$$

$$I = \frac{V}{R_1 + R_2} \Leftrightarrow I = \frac{72}{8} = 9A$$

$$V_{2\Sigma} = IR_{2\Sigma} = 9 \cdot 2 = 18V$$

$$V_2 = V_{\Sigma} = V_{2\Sigma} = 18V$$

Η συσκευή υπολειτουργεί

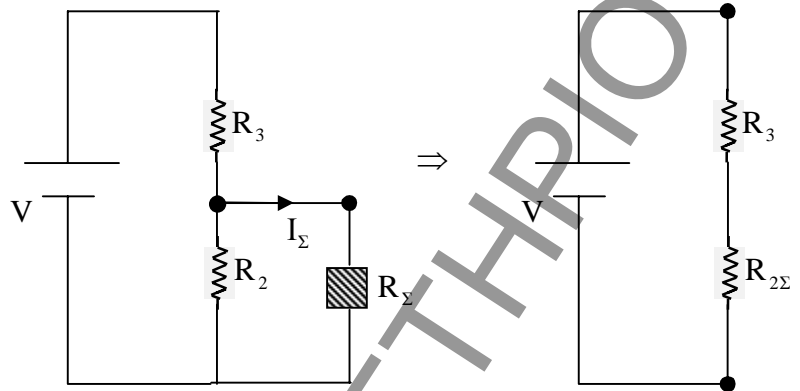


γ) Η συσκευή λειτουργεί κανονικά.

$$V_2 = V_{\Sigma} = V_{2\Sigma} = 24V$$

$$I_{2\Sigma} = \frac{V_{2\Sigma}}{R_{2\Sigma}} \Rightarrow I_{2\Sigma} = 12A$$

$$I_3 = I_{2\Sigma} = I = 12A$$



$$V = I(R_3 + R_{2\Sigma}) \Rightarrow R_3 = \frac{V}{I} - R_{2\Sigma} \Rightarrow R_3 = 4\Omega$$

B2.

$$\alpha) A_I = \frac{I_{O,εξ}}{I_{O,εισ}} \Rightarrow I_{O,εξ} = A_I I_{O,εισ} \Rightarrow I_{O,εξ} = 0,5 \cdot 10^{-3} \cdot 10^3 = 0,5A$$

$$dB(\text{τάσης}) = 20 \log \frac{V_{O,εξ}}{V_{O,εισ}} \Rightarrow 80 = 20 \log \frac{V_{O,εξ}}{V_{O,εισ}} \Rightarrow \log \frac{V_{O,εξ}}{V_{O,εισ}} = 4 \Rightarrow V_{O,εξ} = 10^4 V_{O,εισ}$$

$$A_V = \frac{V_{O,εξ}}{V_{O,εισ}} = 10^4$$

$$dB(\text{έντασης}) = 20 \log A_V = 20 \log 10^4 = 20 \cdot 4 = 80dB(\text{έντασης})$$

$$\beta) A_P = A_I \cdot A_V \Rightarrow A_P = 10^7$$

$$dB(\text{Ισχύος}) = 10 \log A_P = 10 \log 10^7 = 70dB(\text{Ισχύος})$$

B3.

$$\alpha) X_C = \frac{1}{C\omega} = \frac{1}{100 \cdot 10^{-6} \cdot 500} \Rightarrow X_C = 20\Omega$$

$$\beta) z = \sqrt{R^2 + X_C^2} = 20\sqrt{2}\Omega$$

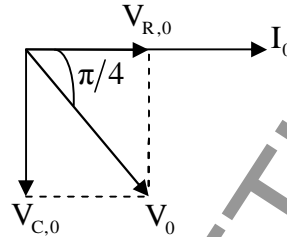
$$\gamma) \cos\varphi = \frac{R}{z} = \frac{\sqrt{2}}{2} \Rightarrow \varphi = \frac{\pi}{4}$$

$$V_{C,0} = I_0 X_C = 80V$$

$$V_C = 80\eta\mu\left(500t - \frac{\pi}{2}\right) \text{ (SI)}$$

$$V_0 = I_0 z = 80\sqrt{2}V$$

$$V = 80\sqrt{2}\eta\mu\left(500t - \frac{\pi}{4}\right) \text{ (SI)}$$



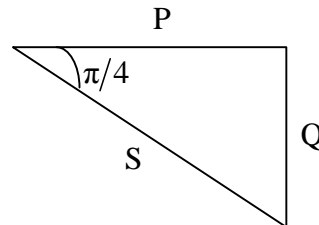
$$\delta) I_{\varepsilon v} = \frac{I_0}{\sqrt{2}} = 2\sqrt{2}A$$

$$V_{\varepsilon v} = \frac{V_0}{\sqrt{2}} = 80V$$

$$P = I_{\varepsilon v} V_{\varepsilon v} \cos\varphi \Rightarrow P = 160W$$

$$Q = I_{\varepsilon v} V_{\varepsilon v} \eta\mu\varphi \Rightarrow Q = -160V_r$$

$$S = I_{\varepsilon v} V_{\varepsilon v} \Rightarrow S = 160\sqrt{2}VA$$



$$\epsilon) \text{ Συντονισμός: } X_L = X_C \Rightarrow X_L = 20\Omega$$

$$X_L = L\omega \Rightarrow L = \frac{X_L}{\omega} = 4 \cdot 10^{-2}H$$

Επιμέλεια: Τσάμης Μανώλης