

ΗΛΕΚΤΡΟΛΟΓΙΑ

ΤΕΧΝΟΛΟΓΙΚΗΣ ΚΑΤΕΥΘΥΝΣΗΣ Γ' ΛΥΚΕΙΟΥ
(ΚΥΚΛΟΣ ΤΕΧΝΟΛΟΓΙΑΣ & ΠΑΡΑΓΩΓΗΣ)

27 ΜΑΪΟΥ 2009

ΑΠΑΝΤΗΣΕΙΣ

ΟΜΑΔΑ Α

A.1 β

A.2 δ

A.3 γ

A.4 β

A.5 α

A.6

α. Λάθος

β. Σωστό

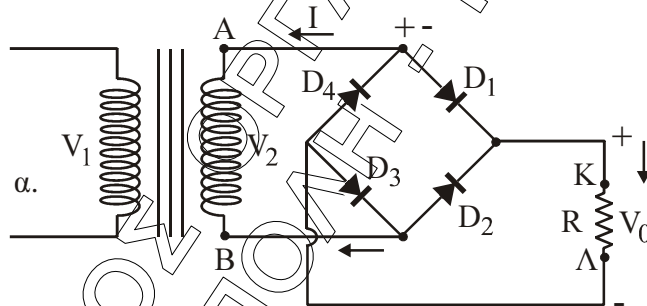
γ. Λάθος

δ. Λάθος

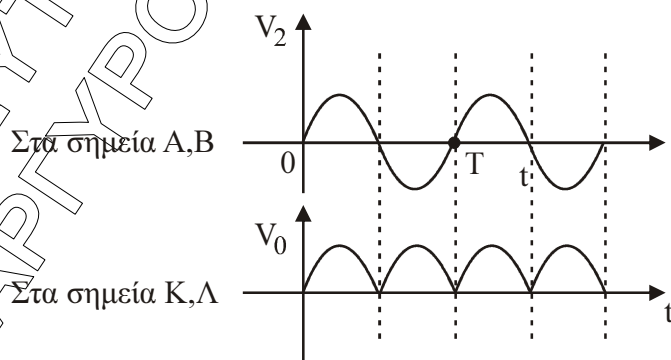
ε. Σωστό

A.7

α.



β. οι κυματομορφές είναι:



A.8

$$\begin{aligned} & (\overline{x+y}) + x \cdot y + \overline{y} \cdot y = \\ & = x + y + xy + \overline{y}y = \\ & = x(1+y) + y(1+\overline{y}) = x \cdot 1 + y \cdot 1 = x + y \end{aligned}$$

ή εναλλακτικά με χρήση πίνακα αλήθειας:

x	y	$\bar{x}$	$\bar{y}$	$\bar{x} \cdot \bar{y}$	$\overline{\bar{x} \cdot \bar{y}}$	$x + \bar{y}$	$(x + \bar{y})y$	$(\overline{\bar{x} \cdot \bar{y}}) + (x + \bar{y}) \cdot y$	$x + y$
0	0	1	1	1	0	1	0	0	0
0	1	1	0	0	1	0	0	1	1
1	0	0	1	0	1	1	0	1	1
1	1	0	0	0	1	1	1	1	1

ΟΜΑΔΑ Β

B.1

$$I_1 = \frac{V_{AB}}{R_1} = \frac{50}{12} \text{ A}$$

$$I_2 = \frac{V_{BF}}{R_2} = \frac{50}{20} = \frac{5}{2} \text{ A}$$

$$I_x = I_1 - I_2 = \frac{50}{12} - \frac{5}{2} = \frac{20}{12} \text{ A}$$

$$\text{Άρα: } R_x = \frac{V_{BF}}{I_x} = \frac{50}{\frac{20}{12}} = \frac{50 \cdot 12}{20} = 30 \Omega$$

B.2

$$d_{\text{B τάσης}} = 20 \log \frac{V_{\text{θεξ}}}{V_{\text{θεισ}}}$$

$$\alpha. 60 = 20 \log \frac{10}{V_{\text{θεισ}}}$$

$$\log \frac{10}{V_{\text{θεισ}}} = 3 \Rightarrow \frac{10}{V_{\text{θεισ}}} = 1000 \Rightarrow V_{\text{θεισ}} = \frac{10}{1000} = 0,01$$

$$\beta. A_p = A_I \cdot A_V = 5 \cdot 1000 = 5000$$

$$A_V = 1000 \quad (A_{V(\text{dB})} = 10 \log A_V \Rightarrow 60 = 10 \log A_V \Rightarrow \log = 6 \Rightarrow A_V = 1000)$$

$$A_I = 5$$

B.3.α.

$$X_L = \omega L \Leftrightarrow L = \frac{X_L}{\omega} = \frac{8}{200} = 0,04 (\text{H})$$

$$\beta. Z_{\Pi} = \sqrt{R_{\Pi}^2 + X_L^2} = \sqrt{36 + 64} = \sqrt{100} = 10 (\Omega)$$

$$\gamma. Z = \sqrt{(R_1 + K_{\Pi})^2 + X_L^2} = \sqrt{8^2 + 8^2} = \sqrt{2 \cdot 64} = 8\sqrt{2} (\Omega)$$

$$\delta. I_0 = \frac{V_0}{Z} = \frac{80}{8\sqrt{2}} = \frac{80 \cdot \sqrt{2}}{8 \cdot 2} = 5\sqrt{2} (\text{A})$$

$$\epsilon. \cos \varphi = \frac{R}{Z} = \frac{8}{8\sqrt{2}} = \frac{\sqrt{2}}{2} \quad (\varphi = 45^\circ)$$

$$\sigma\tau. P_{\Pi} = \frac{1}{2} V_0 \cdot I_0 \cos \varphi = \frac{1}{2} \cdot 80 \cdot 5\sqrt{2} \cdot \frac{\sqrt{2}}{2} = 200 (\text{W})$$

$$S = \frac{1}{2} V_0 \cdot I_0 = \frac{1}{2} \cdot 80 \cdot 5\sqrt{2} = 200\sqrt{2} (\text{VA})$$

$$Q = \frac{1}{2} V_0 \cdot I_0 \eta \mu \varphi = \frac{1}{2} \cdot 80 \cdot 5\sqrt{2} \cdot \frac{\sqrt{2}}{2} = 200 (\text{VA})$$

$$\eta \mu \varphi = \frac{X_L}{Z} = \frac{8}{8\sqrt{2}} = \frac{\sqrt{2}}{2}$$