ΑΠΟΛΥΤΗΡΙΕΣ ΕΞΕΤΑΣΕΙΣ ΤΗΣ Γ' ΛΥΚΕΙΟΥ
ΗΛΕΚΤΡΟΛΟΓΙΑ ΤΕΧΝΟΛΟΓΙΚΗΣ ΚΑΤΕΥΘΥΝΣΗΣ

ΟΙ ΑΠΑΝΤΗΣΕΙΣ ΤΩΝ ΘΕΜΑΤΩΝ ΑΠΟ ΚΑΘΗΓΗΤΕΣ

του ΦΡΟΝΤΙΣΤΗΡΙΟΥ

'Ορίον φροντιστήριο μέσης εκπαίδευσης

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ΟΜΑΔΑ ΠΡΩΤΗ

Α1.1. δ , **Α1.2.** α , **Α1.3.** β , **Α.1.4.** α

Α2. $(9\text{A})_{16} = 9\cdot 16^1 + 10\cdot 16^0 = 154 = 1\cdot 10^2 + 5\cdot 10^1 + 4\cdot 10^0 = (154)_{10}$

$154 = 128+16+8+2 = 1\cdot 2^7 + 0\cdot 2^6 + 0\cdot 2^5 + 1\cdot 2^4 + 1\cdot 2^3 + 0\cdot 2^2 + 1\cdot 2^1 + 0\cdot 2^0 =$

$= (10011010)_2$

Α3.

$$\begin{vmatrix} (\text{x}, & \text{y}, & \text{z}, & \text{f}) \\ (0, & 0, & 0, & 0) \\ (0, & 0, & 1, & 1) \\ (0, & 1, & 0, & 0) \\ (0, & 1, & 1, & 1) \\ (1, & 0, & 0, & 0) \\ (1, & 0, & 1, & 1) \\ (1, & 1, & 0, & 1) \\ (1, & 1, & 1, & 1) \end{vmatrix}$$

Α4. Έχουμε παράλληλη σύνδεση:

$$\frac{1}{\text{R}_{\text{AB}}} = \frac{1}{\text{R}} + \frac{1}{\text{R}} + \frac{1}{\text{R}} = \frac{3}{\text{R}} \Rightarrow \text{R}_{\text{AB}} = \frac{\text{R}}{3} = \frac{12\Omega}{3} = 4\ \Omega$$

Α5. α. Από το σχολικό βιβλίο, σελ. 169:

«Ο λόγος των .... V_{CE} σταθερή»

β. $\beta = \dfrac{\Delta I_C}{\Delta I_B} = \dfrac{5\text{mA}}{100\mu\text{A}} = \dfrac{5\cdot 10^{-3}\,\text{A}}{100\cdot 10^{-6}\,\text{A}} = 50$ (πάνω καμπύλη)

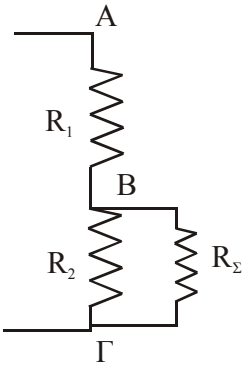
και όμοια στις άλλες.

ΟΜΑΔΑ ΔΕΥΤΕΡΗ

Β1. α. $V_{AB} = IR_1 = \dfrac{R_1}{R_1+R_2}V = \dfrac{6}{6+3}\cdot 72\text{V} = 48\text{V}$

$V_{B\Gamma} = IR_2 = \dfrac{R_2}{R_1+R_2}V = \dfrac{6}{6+3}\cdot 72\text{V} = 24\text{V}$

β. $P_K = \dfrac{V_K^2}{R_\Sigma} \Rightarrow R_\Sigma = \dfrac{V_K^2}{P_K} = \dfrac{24^2}{96}\Omega = 6\ \Omega$ συσκευής



$R_{o\lambda} = R_1 + \dfrac{R_2\cdot R_\Sigma}{R_2+R_\Sigma} = \left(6+\dfrac{3\cdot 6}{3+6}\right)\Omega = 8\ \Omega$

$I_{o\lambda} = \dfrac{V}{R_{o\lambda}} = \dfrac{72}{8}\text{A} = 9\ \text{A}$

$R_{2\Sigma} = \dfrac{R_2\cdot R_\Sigma}{R_2+R_\Sigma} = \dfrac{3\cdot 6}{3+6}\Omega = 2\ \Omega$

Άρα $V_\Sigma = V_{B\Gamma} = I_{o\lambda}R_{2\Sigma} \Rightarrow V_\Sigma = 9\cdot 2\text{V} = 18\text{V} \neq V_K$ και η συσκευή δεν λειτουργεί κανονικά.

γ. $V_{B\Gamma} = V_K = 24\text{V}$, $R_{2\Sigma} = 2\ \Omega$, $I'_{o\lambda} = \dfrac{V_{B\Gamma}}{R_{2\Sigma}} = \dfrac{24}{2}\text{A} = 12\text{A}$

$V_{AB} = V - V_{B\Gamma} = (72-24)\text{V} = 48\text{V}$

$V_{AB} = I'_{o\lambda}\cdot R_3 \Rightarrow R_3 = \dfrac{V_{AB}}{I'_{o\lambda}} = \dfrac{48}{12}\Omega = 4\Omega$

B2. α. $A_I = \dfrac{I_{0,\varepsilon\xi.}}{I_{0,\varepsilon\iota\sigma.}} \Rightarrow I_{0,\varepsilon\xi.} = A_I \cdot I_{0,\varepsilon\iota\sigma.} = 10^3 \cdot 0,5\text{mA} = 0,5\text{A}$

$dB_{\varepsilon\nu\tau.} = 20\log A_I = 20 \cdot \log 10^3 = 60$

β. $dB_{\tau\alpha\sigma.} = 20\log\dfrac{V_{0,\varepsilon\xi.}}{V_{0,\varepsilon\iota\sigma.}} \Rightarrow 8\not{0} = 2\not{0}\log\dfrac{V_{0,\varepsilon\xi.}}{V_{0,\varepsilon\iota\sigma.}} \Rightarrow$

$\Rightarrow \log\dfrac{V_{0,\varepsilon\xi.}}{V_{0,\varepsilon\iota\sigma.}} = 4 \Rightarrow \dfrac{V_{0,\varepsilon\xi.}}{V_{0,\varepsilon\iota\sigma.}} = 10^4 = A_V$

και $A_P = A_I \cdot A_V = 10^3 \cdot 10^4 = 10^7 = \dfrac{P_{\varepsilon\xi.}}{P_{\varepsilon\iota\sigma.}}$, οπότε:

$dB_{\iota\sigma\chi.} = 10\log\dfrac{P_{\varepsilon\xi.}}{P_{\varepsilon\iota\sigma.}} = 10 \cdot \log 10^7 = 70$

B3. Με $i = 4\eta\mu 500t$ ή $i = I_0\eta\mu\omega t$ έχουμε: $I_0 = 4\text{A}$, $\omega = 500\,\text{rad}/\text{s}$

α. $x_c = \dfrac{1}{\omega c} = \dfrac{1}{500 \cdot 100 \cdot 10^{-6}}\Omega = 20\ \Omega$

β. $Z = \sqrt{R^2 + x_c^2} = \sqrt{20^2 + 20^2}\,\Omega = 20\sqrt{2}\Omega$

γ. $V_0 = I_0 \cdot Z = 4 \cdot 20\sqrt{2}\text{V} = 80\sqrt{2}\text{V}$

$V_{0C} = I_0 X_C = 4 \cdot 20\text{V} = 80\text{V}$

$V_C = V_{0C}\eta\mu\left(\omega t - \dfrac{\pi}{2}\right) = 80\eta\mu\left(500t - \dfrac{\pi}{2}\right)$,

$V = V_0\eta\mu(\omega t - \varphi)$, $\sigma\upsilon\nu\varphi = \dfrac{R}{Z} = \dfrac{20}{20\sqrt{2}} = \dfrac{\sqrt{2}}{2} \Rightarrow \varphi = \dfrac{\pi}{4}$

οπότε: $V = 80\sqrt{2}\eta\mu\left(500t - \dfrac{\pi}{4}\right)$

δ. $P_{\pi\rho\alpha\gamma\mu} = \frac{1}{2} V_0 I_0 \sigma\upsilon\nu\varphi = \frac{1}{2} 80\sqrt{2} \cdot 4 \cdot \frac{\sqrt{2}}{2} W = 160\ W$

$Q_{\alpha\varepsilon\rho\gamma.} = \frac{1}{2} V_0 I_0 \eta\mu\varphi = \frac{1}{2} 80\sqrt{2} \cdot 4 \cdot \frac{\sqrt{2}}{2} W = 160\ W$

$S_{\varphi\alpha\iota\nu.} = \frac{1}{2} V_0 I_0 = \frac{1}{2} 80\sqrt{2} \cdot 4W = 160\sqrt{2}\ W$

ε. $x_C = x_L \Rightarrow \frac{1}{c\omega} = L\omega \Rightarrow L = \frac{1}{c\omega^2} \Rightarrow L = \frac{1}{100 \cdot 10^{-6} \cdot 500^2} H = \frac{1}{25} H$