ΤΑΞΗ: Γ΄ ΓΕΝΙΚΟΥ ΛΥΚΕΙΟΥ
ΚΑΤΕΥΘΥΝΣΗ: ΤΕΧΝΟΛΟΓΙΚΗ (1ος Κύκλος)
ΜΑΘΗΜΑ: ΗΛΕΚΤΡΟΛΟΓΙΑ

Ημερομηνία: Κυριακή 22 Απριλίου 2012

ΑΠΑΝΤΗΣΕΙΣ

ΟΜΑΔΑ Α

Α.1. δ
Α.2. α
Α.3. γ
Α.4. γ

Α.5.
α. Λ
β. Λ
γ. Σ
δ. Σ
ε. Σ

Α.6.

$$P_\Sigma = \frac{V_\Sigma^2}{R_\Sigma} \Rightarrow R_\Sigma = \frac{V_\Sigma^2}{P_\Sigma} = \frac{400}{100} \Rightarrow R_\Sigma = 4\Omega$$

$$I_\Sigma = \frac{V_\Sigma}{R_\Sigma} = \frac{20}{4} \Rightarrow I_\Sigma = 5A$$

$$I_\Sigma = \frac{\frac{1}{R_\Sigma}}{\frac{1}{R_1}+\frac{1}{R_2}+\frac{1}{R_\Sigma}} \cdot I = \frac{\frac{1}{4}}{\frac{1}{4}+\frac{1}{2}+\frac{1}{4}} \cdot 20 \Rightarrow I_\Sigma = 5A$$

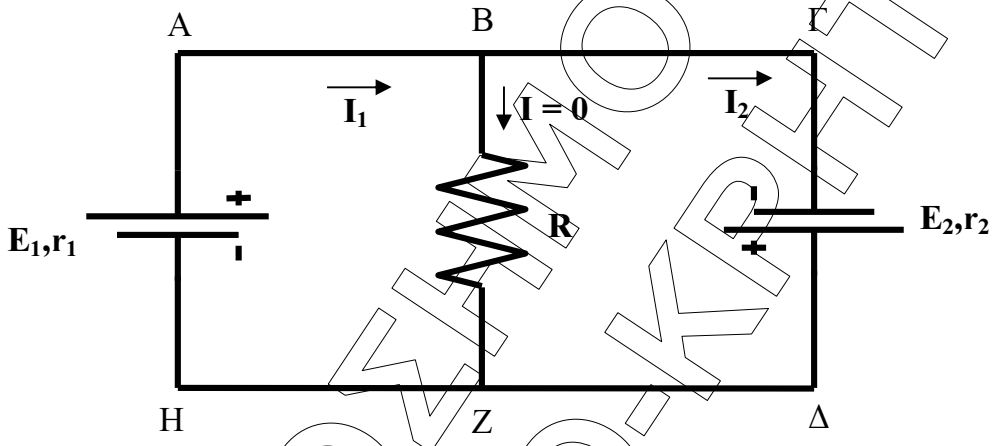
Άρα λειτουργεί κανονικά.

Α.7. α. 2ος Ν.Κ.(ΑΒΖΗ): $-E_1 + I_1 r_1 = 0 \Rightarrow I_1 = \frac{E_1}{r_1}$

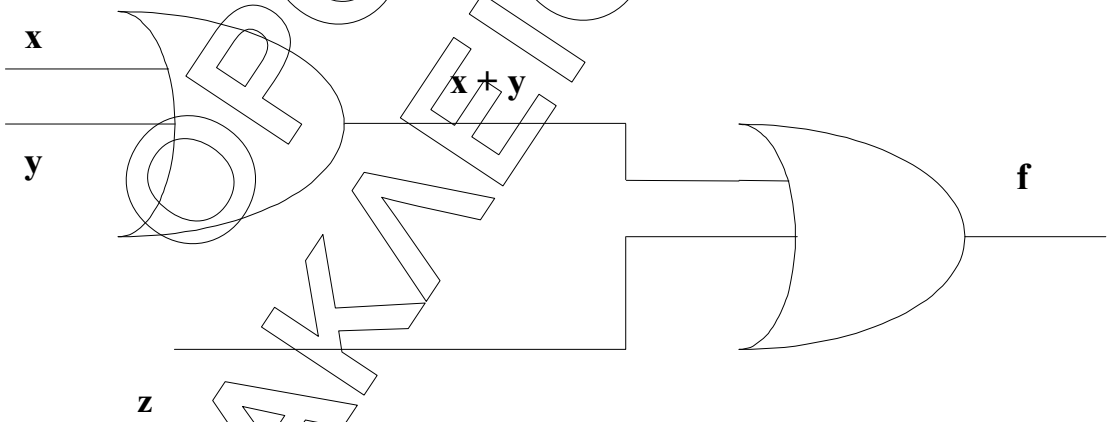
2ος Ν.Κ.(ΒΓΖΔ): $-E_2 + I_2 r_2 = 0 \Rightarrow I_2 = \frac{E_2}{r_2}$

Εφόσον $I_R=0$ θα έχω: $I_1 = I_2$.

$$\frac{E_1}{r_1} = \frac{E_2}{r_2} \Rightarrow E_2 = E_1 \cdot \frac{r_2}{r_1} = 20 \cdot \frac{3}{1} = 60\,V$$



β.



x	y	z	f
0	1	0	1
1	0	0	1
1	1	0	1
0	0	0	0
0	1	1	1
1	0	1	1
1	1	1	1
0	0	1	1

ΟΜΑΔΑ Β

Β.1. **α.**

$$V_0 = N\omega BA = 500 \cdot 400 \cdot 0,02 \cdot 0,04 = 160V$$

$$Z = \sqrt{R^2 + (L\omega)^2} = \sqrt{40^2 + 40^2} = 40\sqrt{2}\Omega$$

$$I_0 = \frac{V_0}{Z} = \frac{160}{40\sqrt{2}} = \frac{40\sqrt{2}}{2} = 20\sqrt{2}A$$

β. $\varepsilon\varphi\theta = \frac{X_L}{R} = \frac{\omega \cdot L}{R} = 1$

$$I = I_0 \eta\mu\omega t \Rightarrow I = 20\sqrt{2}\eta\mu(400t - \frac{\pi}{4})$$

γ. $Z' = \sqrt{R^2 + (2L\omega)^2} = \sqrt{40^2 + 4 \cdot 40^2} = 40\sqrt{5}\,\Omega$

δ.

$$V_0' = N \cdot 2\omega \cdot B \cdot A = 320V$$

$$I_0' = \frac{V_0'}{Z'} = \frac{320}{40\sqrt{5}} = \frac{8\sqrt{5}}{5} = 1,6\sqrt{5}A$$

$$\varepsilon\varphi\theta' = \frac{X_L'}{R} = \frac{\omega' \cdot L}{R} = 2$$

$$I' = 1,6\sqrt{5}\eta\mu(800t - \theta')(S.I.)$$

$$V' = 320\eta\mu 800t(S.I.)$$

Β.2. **α.**. $P_\Lambda = \frac{V_\Lambda^2}{R_\Lambda} \Rightarrow R_\Lambda = \frac{V_\Lambda^2}{P_\Lambda} = \frac{625}{125} = 5\,\Omega$

β.

$$E_{ολ} = E_1 + E_2 - E_3 + E_4 = 40 + 30 - 25 + 40 = 85V$$

$$r_{ολ} = \frac{r_1 + r_2 + r_3 + r_4}{3} = \frac{6}{3} = 2\Omega$$

$$I = \frac{E_{ολ}}{N \cdot R_Λ + r_{ολ}}$$

$$I = I_Λ = \frac{V_Λ}{R_Λ} = 5A$$

$$5 = \frac{85}{N \cdot 5 + 2} \Rightarrow N = 3$$

γ.

$$I_{ΚΛΑΔΟΥ} = \frac{I_Λ}{3}$$

$$V_{AB} = -V_{Π_{E3}} = -E_3 + \frac{I_Λ}{3} \cdot r_3 = -25 + \frac{5}{3} \cdot 1 = -\frac{70}{3} V$$

δ. $$V_{Π_{E1}} = E_1 - \frac{I_Λ}{3} \cdot r_1 = 40 - \frac{5}{3} \cdot 2 = \frac{110}{3} V$$