
ΑΠΑΝΤΗΣΕΙΣ
ΠΑΝΕΛΛΑΔΙΚΩΝ ΕΞΕΤΑΣΕΩΝ 2023

ΗΛΕΚΤΡΟΤΕΧΝΙΑ ΙΙ

ΩΡΑ ΑΝΑΡΤΗΣΗΣ

13:30



φροντιστήρια
ΠΟΥΚΑΜΙΣΣΑΣ

Ο ΜΕΓΑΛΥΤΕΡΟΣ ΦΡΟΝΤΙΣΤΗΡΙΑΚΟΣ ΟΜΙΛΟΣ ΣΤΗΝ ΕΛΛΑΔΑ

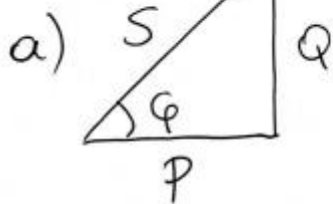
ΘΕΜΑ Α

A1. α. Σ, β. Λ, γ. Λ, δ. Σ, ε. Λ

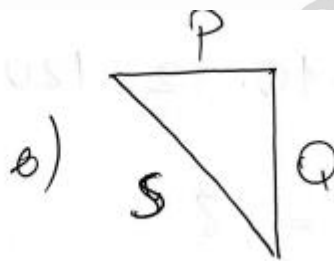
A2. 1. γ, 2. στ, 3. α, 4. β, 5. ε

ΘΕΜΑ Β

B₁.



Επαγωγική
συμπεριφορά



Χωρητική
συμπεριφορά

B2. $u_1 = 230\sqrt{2}\eta\mu(314t + 20^\circ)$
 $u_2 = 230\sqrt{2}\eta\mu(314t - 100^\circ)$
 $u_3 = 230\sqrt{2}\eta\mu(314t - 220^\circ)$

B3. α) $\phi_0 = 45^\circ$

β) $U_{\text{EV}} = U_0 / \sqrt{2} = 30 / \sqrt{2} = 30 / \sqrt{2} = 15\text{V}$

γ) $t = 0 \rightarrow U = (30 / \sqrt{2}) / (\sqrt{2} / 2) = 15\text{V}$

δ) $U_{\text{EV(ανορθ)}} = 0,5 * U_{\text{EV}} = 0,5 * 15 = 7,5\text{V}$

ΘΕΜΑ Γ

Γ1. $I_{\text{EV}} = I_0 / \sqrt{2} = 10\sqrt{2} / \sqrt{2} = 10\text{A}$

$Z = U_{\text{EV}} / I_{\text{EV}} = 100 / 10 = 10\Omega$

Γ2. $X_C = 1 / (C * \omega) = 1 / ((1/3) * 10^{-3} * 500) = 3 / 0,5 = 6\Omega$

$X_L = 2 * X_C = 2 * 6 = 12\Omega$

$$Z^2 = (X_L - X_C)^2 + R^2 \Rightarrow 10^2 = (12 - 6)^2 + R^2$$

$$100 = 36 + R^2 \Rightarrow R^2 = 100 - 36 \Rightarrow R = \sqrt{64} \Rightarrow R = 8\Omega$$

$$\Gamma 3. U_{\text{LEV}} = I_{\text{EV}} * X_L = 10 * 12 = 120V$$

$$\Gamma 4. S = U_{\text{EV}} * I_{\text{EV}} = 100 * 10 = 1000VA$$

$$\text{συνφ} = R/Z = 8/10 = 0,8$$

$$P = S * \text{συνφ} = 1000 * 0,8 = 800W$$

$$\eta_{\mu\phi} = \frac{x_L - x_C}{Z} = \frac{12 - 6}{10} = \frac{6}{10} = 0,6$$

$$Q = S \eta_{\mu\phi} = 1000 * 0,6 = 600Var$$

ΘΕΜΑ Δ

$$R = 2\Omega$$

$$L = \frac{40}{n} mH$$

$$C = \frac{100}{n} \mu F$$

$$U = 240\sqrt{2} \eta \mu(500\pi t + 30^\circ)$$

$$\Delta 1. X_L = L * \omega = \frac{40}{\pi} 10^{-3} * 500\pi = \frac{20000}{1000} = 20\Omega$$

$$X_C = \frac{1}{C * \omega} = \frac{1}{\frac{100}{\pi} * 10^{-6} * 500\pi} = \frac{1000000}{50000} = 20\Omega$$

Άρα συντονισμός.

$$\Delta 2. Z = R = 2\Omega$$

$$U_{\text{EV}} = \frac{U_0}{\sqrt{2}} = \frac{240\sqrt{2}}{\sqrt{2}} = 240V$$

$$I_{\text{EV}} = \frac{U_{\text{EV}}}{Z} = \frac{240}{2} = 120A$$

$$\Delta 3. I_0 = \frac{U_0}{Z} = \frac{240\sqrt{2}}{2} = 120\sqrt{2}A$$

$$I = 120\sqrt{2} \eta\mu(500\pi t + 30^\circ)$$

$$\Delta 4. f_0 = \frac{1}{2\pi\sqrt{LC}} = \frac{1}{2\pi\sqrt{\left(\frac{40}{\pi}10^{-3} * \frac{100}{\pi}10^{-6}\right)}} = \frac{1}{2\pi\sqrt{\frac{4000}{\pi^2}10^{-9}}} = \frac{1}{2\pi\sqrt{\frac{4*10^3}{\pi^2}10^{-9}}} =$$

$$\frac{1}{2\pi\sqrt{\frac{4}{\pi^2}10^{-6}}} = \frac{1}{2\pi * \frac{2}{\pi} * 10^{-3}} = \frac{1}{4 * 10^{-3}} = \frac{1000}{4} = 250Hz$$

$$Q_\pi = \frac{U_L}{U} = \frac{I_{\varepsilon V} * X_L}{I_{\varepsilon V} * Z} = \frac{X_L}{Z} = \frac{20}{2} = 10$$