



ΗΛΕΚΤΡΟΤΕΧΝΙΑ 2. ΕΠΑΛ

ΠΡΟΤΕΙΝΟΜΕΝΕΣ.

ΑΠΑΝΤΗΣΕΙΣ. ΘΕΜΑΤΩΝ.

ΘΕΜΑ Α.

A1

$\alpha \rightarrow \zeta$

$\beta \rightarrow \lambda$

$\gamma \rightarrow \lambda$

$\delta \rightarrow \zeta$

$\epsilon \rightarrow \lambda$

A2

$1 \rightarrow \gamma$

$2 \rightarrow \alpha$

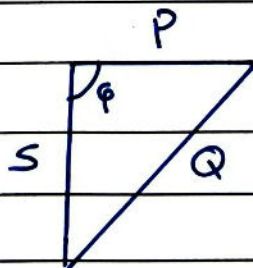
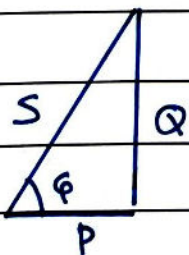
$3 \rightarrow \alpha$

$4 \rightarrow \beta$

$5 \rightarrow \epsilon$

ΘΕΜΑ Β.

B1.



Επαγωγική
αμπερίφορα

χωρητική
αμπερίφορα



B2.

$$U_1 = 230\sqrt{2} \text{ nV} (314t + 20^\circ)$$

$$U_2 = 230\sqrt{2} \text{ nV} (314t - 100^\circ)$$

$$U_3 = 230\sqrt{2} \text{ nV} (314t - 22^\circ)$$

B3.

$$u = \frac{30}{\sqrt{2}} \text{ nV} (20\pi t + 45^\circ) \text{ V.}$$

α) $\rightarrow \varphi_0 = 45^\circ$

β) $\rightarrow U_{\text{EV}} = U_0 / \sqrt{2} \Leftrightarrow U_{\text{EV}} = \frac{30/\sqrt{2}}{\sqrt{2}} = \frac{30}{\sqrt{2} \cdot \sqrt{2}} = \frac{30}{2} = 15 \text{ uVolt.}$

γ) \rightarrow για $t=0$ $U = \frac{30}{\sqrt{2}} \text{ nV} (20\pi \cdot 0 + 45^\circ) \Leftrightarrow$

$$U = \frac{30}{\sqrt{2}} + 45^\circ \Leftrightarrow U = \frac{30}{\sqrt{2}} \cdot \frac{\sqrt{2}}{2} = 15 \text{ uVolt.}$$

δ) $U_{\text{EV}} = 0,5U \Leftrightarrow U_{\text{EV}} = 0,5 \cdot 15 = 7,5 \text{ uVolt.}$



ΘΕΜΑ Γ.

Γ₁.

$$I_{EV} = \frac{U_{EV}}{Z} \quad I_{EV} = \frac{I_0}{\sqrt{2}} \quad \Leftrightarrow \quad I_{EV} = \frac{10\sqrt{2}}{\sqrt{2}} = 10 \text{ A.}$$

$$I = \frac{100}{Z} \quad \Leftrightarrow \quad \boxed{Z = 10 \Omega}$$

Γ₂.

$$X_C = \frac{1}{\omega \cdot C} \quad \Leftrightarrow \quad X_C = \frac{1}{500 \cdot \frac{1}{3} \cdot 10^{-3}} \quad \Leftrightarrow \quad \boxed{X_C = 6 \Omega}$$

$$Z = \sqrt{R^2 + (2X_C - X_C)^2} \quad \text{διότι} \quad X_L = 2X_C$$

$$R^2 = Z^2 - X_C^2 \quad \Leftrightarrow \quad R^2 = 100 - 36 \quad \Leftrightarrow \quad R^2 = 64 \quad \Leftrightarrow \quad \boxed{R = 8 \Omega}$$

Γ₃.

$$I_{EV} = \frac{U_L}{X_L} \quad \Leftrightarrow \quad U_L = I_{EV} \cdot X_L \quad \Leftrightarrow \quad U_L = 10 \cdot 12 \quad \Leftrightarrow \quad U_L = 120 \text{ V}$$



Γ4

$$P = U_{\text{EV}} \cdot I_{\text{EV}} \cdot \cos \phi \quad \text{όπου } \cos \phi = \frac{R}{Z} = 0,8$$

$$P = 100 \cdot 10 \cdot 0,8$$

$$P = 800 \text{ watt.}$$

$$Q = U_{\text{EV}} \cdot I_{\text{EV}} \cdot \sin \phi \quad \text{όπου } \sin \phi = \frac{X_L - X_C}{Z} = 0,6$$

$$Q = 1.000 \cdot 0,6$$

$$Q = 600 \text{ VAR.}$$

$$S = U_{\text{EV}} \cdot I_{\text{EV}}$$

$$S = 100 \cdot 10$$

$$S = 1.000 \text{ VA.}$$



ΘΕΜΑ Δ.

Δ₁

$$X_L = \omega \cdot L \quad \Leftrightarrow \quad X_L = 500\pi \cdot \frac{40}{\pi} \cdot 10^{-3} \quad \Leftrightarrow \quad X_L = 20 \, \Omega$$

$$X_C = \frac{1}{\omega \cdot C} \quad \Leftrightarrow \quad X_C = \frac{1}{500\pi \cdot \frac{100}{\pi} \cdot 10^{-6}} \quad \Leftrightarrow \quad X_C = \frac{10^6}{500\pi \cdot 100} = X_C = 20 \, \Omega$$

$X_L = X_C$ άρα συντονισμός

Δ₂

Συντονισμός άρα $Z = R$ άρα $Z = 20 \, \Omega$

$$I_{EV} = \frac{V_{EV}}{R} \quad \Leftrightarrow \quad I_{EV} = \frac{240}{2} = 120 \, A$$

Δ₃

$$i = 120\sqrt{2} \, \text{mA} \cdot (500\pi t + 30^\circ)$$



Δ4

$$\omega = 2\pi f \quad \Leftrightarrow \quad 500\pi = 2\pi \cdot f \quad \Leftrightarrow \quad f = \frac{500\pi}{2\pi} = 250 \text{ Hz.}$$

$$\varphi_L = \frac{V_L}{U_{\text{eff}}} = \frac{2400}{240} = \boxed{10}$$

$$\text{οπότε } V_L = I \cdot X_L \Leftrightarrow V_L = 120 \cdot 20 = 2400 \text{ V.}$$