

REŠENJA

1. a)

$$S = \sqrt{P^2 + Q^2}$$

$$P = S \cos \phi \Rightarrow \cos \phi = P / S$$

b)

$$S = UI \Rightarrow I = S / U = \sqrt{P^2 + Q^2} / U$$

$$\underline{S} = \underline{Z} I^2 = R I^2 + j \omega L I^2 = P + jQ$$

$$R = P / I^2 = P U^2 / (P^2 + Q^2)$$

$$L = Q / \omega I^2 = Q U^2 / \omega (P^2 + Q^2)$$

c)

$$P_1 = U^2 / R = (P^2 + Q^2) / P$$

2. a)

$$2e^{j0} - 2e^{-j\pi/2} + e^{j\pi/3} = Ae^{j\theta}$$

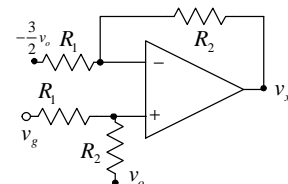
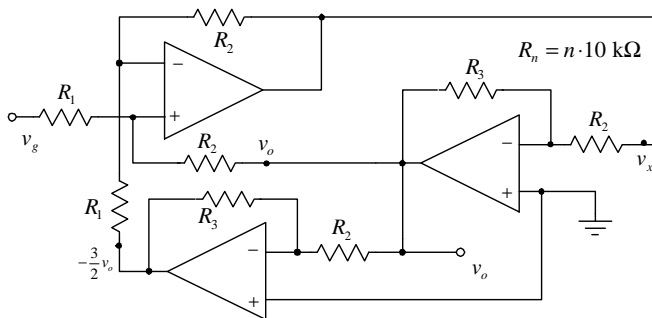
$$2 + 2j + \frac{1}{2} + j\frac{\sqrt{3}}{2} = 2.5 + 2.87j \Rightarrow A = 3.8, \theta = 49^\circ$$

b)

$$R_{22} = R_2$$

$$v_p = (v_2 - v_1) \frac{R_2}{R_1} + v_3 \left(\frac{R_1}{R_2 + R_1} \right) \left(1 + \frac{R_2}{R_1} \right) = (v_2 - v_1) \frac{R_2}{R_1} + v_3 = 2(\cos \omega t - \sin \omega t) + \cos(\omega t + \pi/3) = A \cos(\omega t + \theta)$$

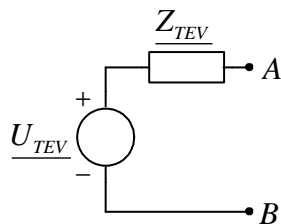
3.



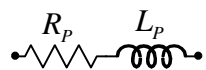
$$v_x = \left(v_g - \left(-\frac{3}{2} v_0 \right) \right) \frac{R_2}{R_1} + v_0 \left(\frac{R_1}{R_2 + R_1} \right) \left(1 + \frac{R_2}{R_1} \right) = \left(v_g - \left(-\frac{3}{2} v_0 \right) \right) \frac{R_2}{R_1} + v_0 = 2v_g + 3v_0 + v_0 = 2v_g + 4v_0$$

$$v_0 = -\frac{3}{2} v_x = -\frac{3}{2} (2v_g + 4v_0) = -3v_g - 6v_0 \Rightarrow v_0 = -\frac{3}{7} v_g$$

4. a) $\underline{U}_{TEV} = (2 + j5)V$, $\underline{Z}_{TEV} = (2 + j)\Omega$



b) $\underline{Z}_P = (6 + j3)\Omega$



$R_p = 6\Omega$, $L_p = 15,92\mu H$

5.

Za $-10V \leq v_G \leq -8,7V$: $D - ON$, $DZ - proboj$, $v_I = -6V = const.$

Za $-8,7V \leq v_G \leq -0,7V$: $D - ON$, $DZ - OFF$, $v_I[V] = 0,75v_G[V] + 0,525$

Za $-0,7V \leq v_G \leq 10V$: $D - OFF$, $DZ - OFF$, $v_I = 0 = const.$

