1.a) I_3 0,5p $\quad I_3 = \alpha(I_1 + I_2)$ 0,5p

$U_1 = I_1 R + (I_1 + I_2 - I_3)R + (I_1+I_2)2R = 4RI_1 + 3RI_2 - \alpha(I_1+I_2)R = (4-\alpha)RI_1 + (3-\alpha)RI_2$ 0,5p

$U_2 = I_2 R + (I_2 + I_1 - I_3)R + (I_1+I_2)2R = 3RI_1 + 4RI_2 - \alpha(I_1+I_2)R = (3-\alpha)RI_1 + (4-\alpha)RI_2$ 0,5p

---

b.) $\underline{\underline{R}} = R \cdot \begin{bmatrix} 4-\alpha & 3-\alpha \\ 3-\alpha & 4-\alpha \end{bmatrix}$ $4 \times 0{,}5$p

---

c.) $R_{12} = R_{21}$; $R_{11} = R_{22}$ → minden α-ra rec és szim. 0,5p

~~[illegible]~~ $\alpha \leq 3{,}5$-nél passzív 1,5p

---

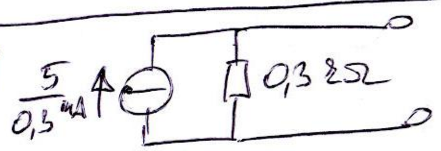
d.) 1) $10 = 0{,}3I_1 + 0{,}5U_2 \quad I_2 = -0{,}5I_1 + 2{,}5U_2$

$U_2 = 0 \quad I_{rz} = -I_2 \quad I_1 = 10/0{,}3 \quad I_2 = \frac{-5}{0{,}3} \quad I_{rz} = \frac{5}{0{,}3} = \underline{\underline{16{,}666\text{ mA}}}$ 1p

$I_2 = 0 \quad 0{,}5I_1 = 2{,}5U_2 \quad 10 = 1{,}5U_2 + 0{,}5U_2 = 2U_2 \quad U_2 = U_{üj} = \underline{\underline{5\text{ V}}}$ 1p

---

d/2)



2. a) $\uparrow i_L \quad \downarrow u_C$ 1p

---

b.) $L\dot{i}_L = C\dot{u}_C R + u_C$; $\frac{L\dot{i}_L}{2R} - i_s + i_L + C\dot{u}_C = 0$; $i = i_L + C\dot{u}_C$ 2p

$\dot{u}_C = \frac{-u_C}{3RC} - \frac{2}{3C}i_L + \frac{2}{3C}i_s \qquad \dot{i}_L = \frac{2}{3L}u_C - \frac{2R}{3L}i_L + \frac{2R}{3L}i_s \qquad i = \frac{-u_C}{3R} + \frac{i_L}{3} + \frac{2}{3}i_s$ 2p

---

c.) $t = +0 \qquad x_1(+0) = 0 \qquad x_2(+0) = 0$ belépő gerj! $\quad y(+0) = 8$ 1,5p

$t \to \infty \qquad 0 = -5x_1 - 2x_2 + 24$ 1p.

$\underline{0 = x_1 - 0{,}2x_2 + 2{,}4}$ $/ \cdot 5 \quad 5x - x_2 + 12 = 0 \mid + \Rightarrow x_2 = 12$

$\underline{\underline{x_1(\infty) = 0}} \qquad \underline{\underline{x_2(\infty) = 12}} \qquad y(\infty) \underline{\underline{= 12}}$ $3 \times 0{,}5$p

---

d.) $(-5-\lambda)(-0{,}2-\lambda) + 2 = 0 \qquad \lambda = \frac{-5{,}2 \pm \sqrt{27{,}04 - 12}}{2} = \begin{cases} -0{,}6609 \ \frac{1}{ms} \\ -4{,}5391 \ \frac{1}{ms} \end{cases}$

$2 \times 0{,}5$p.

K1) $U = \frac{U_0}{4}$

K2) $P = \frac{320}{9} = 35{,}55$ mW

K3) $I = -2$ A

K4) $G_{be} = 0{,}9$ mS

K5) $P_{max} = 90$ mW