

2006 SZÉTV elektronika- elektrotechnika döntő

Tesztjellegű kérdések

1. $P = I^2 * R$

I	0,2	0,4	0,6	0,8	1,0
P	0,4	1,6	3,6	6,4	10

2. $G_1 = 1/R_1 \dots G_e = G_1 + G_2 + G_3 = \underline{100 \mu S}$

3. $Q = I * t = 100 \mu C$; $U = \frac{Q}{C} = \underline{10 V}$

4. $I = \frac{U}{2\pi fL}$

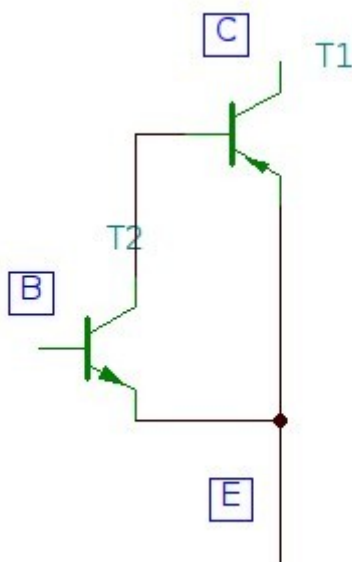
f	1	2	4	8	160
I	5	10	20	40	80

5. $Z = \sqrt{R^2 + (X_L - X_C)^2} = \underline{5 k\Omega}$

6. $P_m = U * I * \sin 32^\circ = \underline{609,4 Var}$

7. $r_d = \frac{\Delta U}{\Delta I} = \underline{5,83 \Omega}$

8.



9. $A_p = A_I * A_U = A_u * \frac{R_{be}}{R_i} = \underline{250}$

$$10. \quad A_{uv} = \frac{A_u}{1 + \beta * A_u} = \underline{\underline{-909}}$$

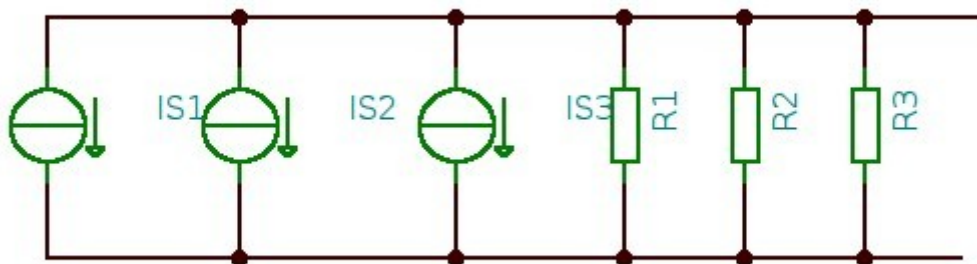
$$11. \quad T = \frac{t}{k} = 40 \mu s \quad f = \frac{1}{T} = \underline{\underline{25 \text{ kHz}}}$$

$$12. \quad F^2 = \overline{A * B} + A * B$$

A	B	F
0	0	1
0	1	0
1	0	0
1	1	1

Összetett feladatok

1.



$$a. \quad R_b = R_1 \times R_2 \times R_3 = \underline{\underline{60 \Omega}}$$

$$I_z = \frac{U_1}{R_1} + \frac{U_2}{R_2} + \frac{U_3}{R_3} = \underline{\underline{120 \text{ mA}}}$$

$$U_g = I_z * R_b = \underline{\underline{7,2 \text{ V}}}$$

$$b. \quad I_1 = \frac{U_1 - U_g}{R_1} = \underline{\underline{-10 \text{ mA}}}$$

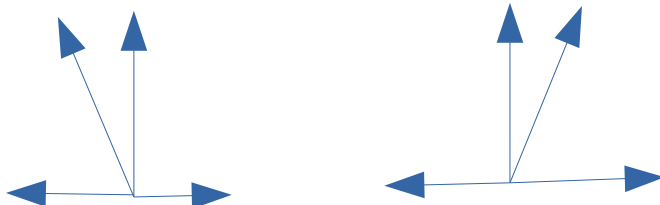
$$I_2 = \frac{U_2 - U_g}{R_2} = \underline{\underline{4 \text{ mA}}}$$

$$I_3 = -I_1 - I_2 = \underline{\underline{6 \text{ mA}}}$$

$$2.a. \quad X_L = 2\pi f L = \underline{\underline{1,005 \text{ k}\Omega}}$$

$$X_c = \frac{1}{2\pi f C_2} = \underline{\underline{482 \Omega}}$$

b.



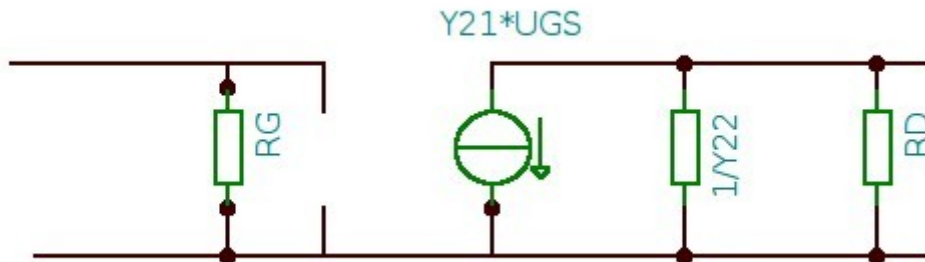
$$X_L - X_C = X_C - X_L$$

$$X_C = 2 * X_L - X_C = \underline{1528 \Omega}$$

$$X_{C1} = X_C - X_{C2} = \underline{1046 \Omega}$$

$$C_1 = \frac{1}{2\pi f X_c'} = \underline{1,52 \text{ nF}}$$

3.



a. $R_G = R_{be} = \underline{200 \text{ k}\Omega}$

$$U_{GS} = -R_S * I_{D0}; \quad R_S = \frac{-U_{GS0}}{I_{D0}} = \underline{1 \text{ k}\Omega}$$

$$R_D = \frac{U_t - U_{DS0} - I_{D0} * R_S}{I_{D0}} = \underline{10 \text{ k}\Omega}$$

b. $R_{ki} = \frac{1}{h_{22}} * R_D = \underline{8 \text{ k}\Omega}$

c. $A_U = \frac{U_{ki}}{U_{be}} = \frac{-U_{GS} * R_{ki} * R_t}{U_{GS}} = \underline{-30}$

d. $X_C = \frac{1}{2\pi * f * C} = 79,6 \text{ k}\Omega$

$$Z = \sqrt{(R_{be}^2 + X_C^2)} = 215 \text{ k}\Omega$$

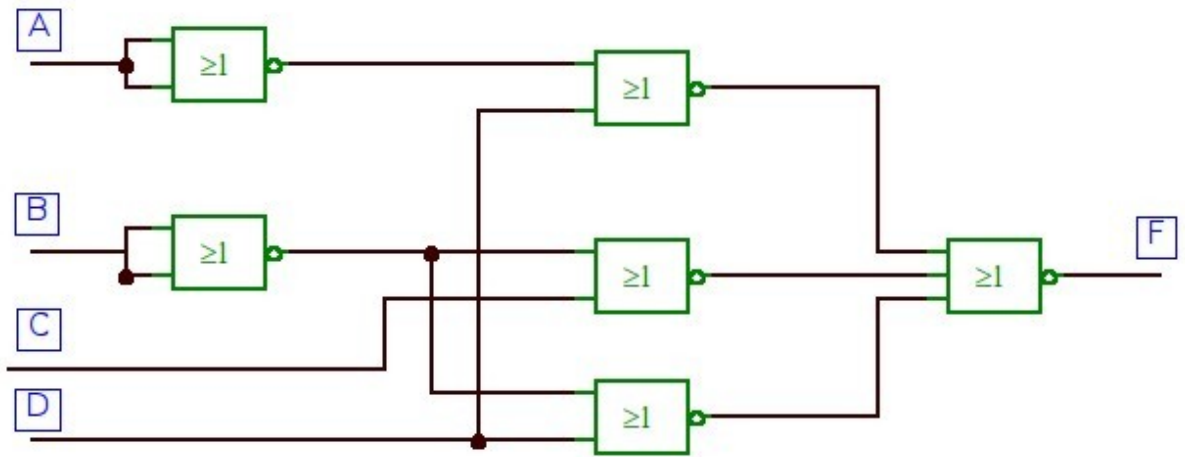
$$I = \frac{U}{Z} = 0,47 \mu A$$

$$U_{GS} = I * R_{be} = \underline{93 \text{ mV}}$$

4. a.

	D		D	
A	15	14	12	13
	11	10	8	9
	3	2	0	1
	7	6	4	5
	C			

$$F^4 = (\bar{B} + C)(\bar{B} + D)(\bar{A} + D)$$



b.

c. $F^4 = \Sigma(0,1,2,3,7,9,11,15)$

		C			
		0	1	3	2
		4	5	7	6
A		12	13	15	14
		8	9	11	10
		D			

$$F_4 = \overline{A} \overline{B} + CD + \overline{B}D$$

d.

