Вариант II

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57^б група

① $R_1 = ?$ $R_2 = ?$ $V_1 = 100V$ $I_1 = 1A$
$V_2 = 50V$

Решение:

$$R_2 = \frac{V_2}{I} = \frac{50}{1} = 50\,\Omega$$

$V_1 = V_{12} + V_2$
$100 = V_{12} + 50$
$V_{12} = 100 - 50 = 50V \rightarrow R_1 = \frac{50}{1} = 50\,\Omega$

② $C_1 = 50\,\mu F$ $C_2 = 50\,\mu F$ / $C = ?$

а) успоредно:
$C = C_1 + C_2 = 100\,\mu F$

б) последователно:
$$\frac{1}{C} = \frac{1}{C_1} + \frac{1}{C_2} = \frac{2}{50} \quad \frac{1}{25}$$

$C = 25\,\mu F$

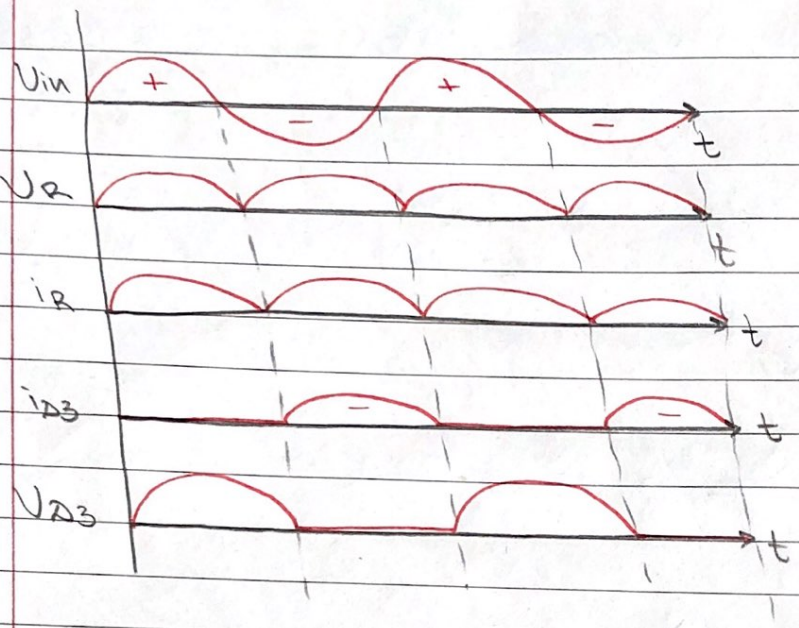
③ $L_1 = 100\,\mu H$ $L_2 = 100\,\mu H$ / $L = ?$

а) успоредно:
$$\frac{1}{L} = \frac{1}{L_1} + \frac{1}{L_2} = \frac{2}{100} \quad \frac{1}{50}$$

$L = 50\,\mu H$

б) последователно:
$L = L_1 + L_2 = 200\,\mu H$

④



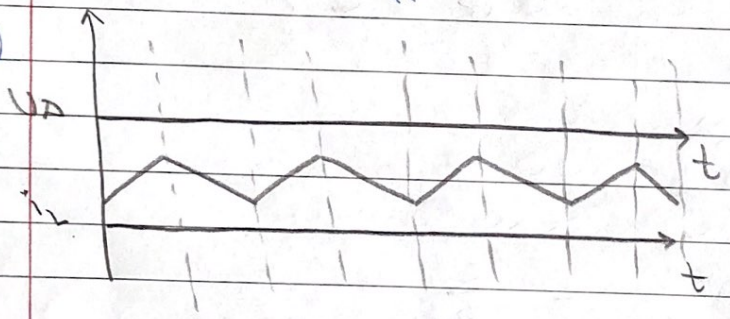
⑤ $U_1 = 150\,V$ / $U_0 = ?$

$\parallel$

V_p

$$U_{cp} = \frac{2}{\pi} \cdot V_p = 0{,}64 \cdot 150 = 95{,}54\,V$$

⑥



$D = 50\% = \frac{t_{on}}{T}$

⑦ $i_1 = 3A$ $\quad i_2 = 1{,}5A$ / $i_3 = ?$

$$i_1 = i_2 + i_3$$
$$3 = 1{,}5 + i_3$$
$$i_3 = 3 - 1{,}5 = 1{,}5A$$

⑧ $U_{AD} = 2\,V$ $\quad U_{BC} = 0{,}5\,V$ / $U_{CD} = ?$

$R_1 = 10\,\Omega$ $\quad R_2 = 5\,\Omega$ / $R_3 = ?$

$$U_{AD} = U_{AB} + U_{BC} + U_{CD}$$

$$R_2 = \frac{U_{BC}}{I}$$

$$R_2 I = U_{BC}$$

$$I = \frac{U_{BC}}{R_2} = \frac{0,5}{5} = 0,1\ A$$

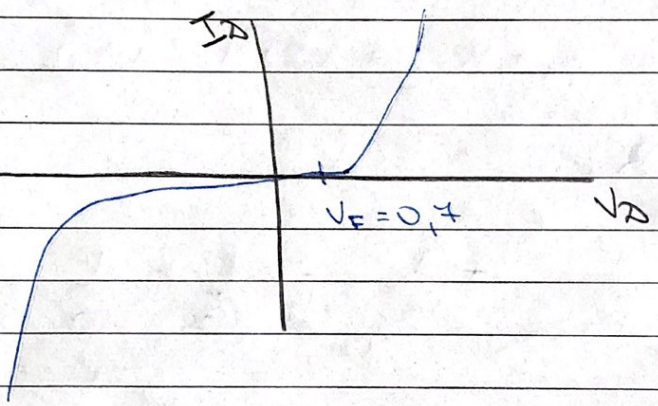
$$R_1 = \frac{U_{AB}}{I} \Rightarrow U_{AB} = R_1 . I = 10 . 0,1 = 1\ V$$

$$\Rightarrow U_{AD} = U_{AB} + U_{BC} + U_{CD}$$

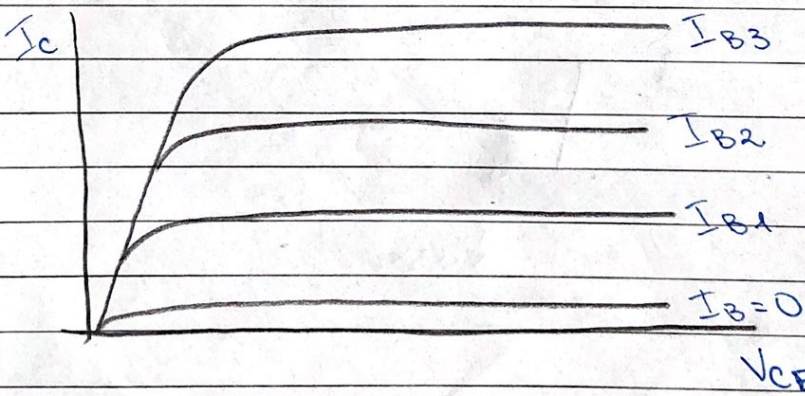
$$2 = 1 + 0,5 + U_{CD}$$

$$U_{CD} = 2 - 1,5 = 0,5 V$$

(9)



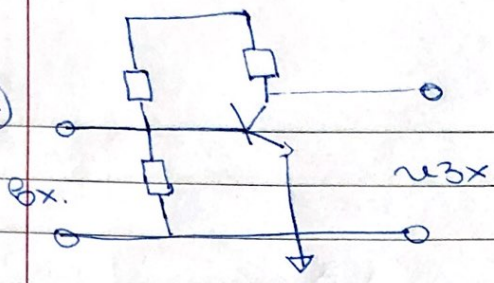
(10)



$$I_{B3} > I_{B2} > I_{B1}$$

биполярен NPN транзистор

(11)



ОЭ

(12) $R_1 = 15\,\Omega$ $R_2 = 8\,\Omega$ $R_3 = 8\,\Omega$ $R_4 = 10\,\Omega$

$R_{экв.}$ м/у т. A и т. B = ?

$$\frac{1}{R_{23}} = \frac{1}{R_2} + \frac{1}{R_3} = \frac{2}{8} \Rightarrow R_{23} = 4\,\Omega$$

R_1 и R_{23}:

$$R_{123} = R_1 + R_{23} = 15 + 4 = 19\,\Omega$$

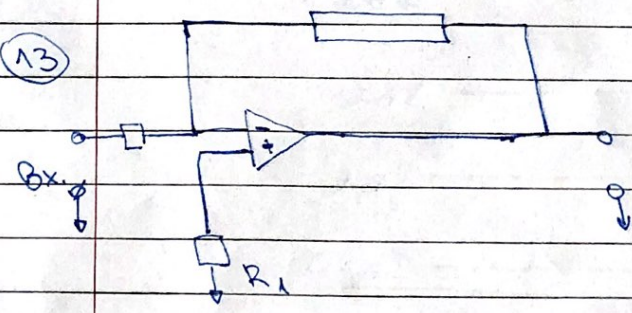
R_{123} и R_4:

$$\frac{1}{R} = \frac{1}{R_{123}} + \frac{1}{R_4} = \frac{1}{19} + \frac{1}{10} = \frac{10+19}{190} = \frac{29}{190}$$

(190)

$$= 0{,}15\,\Omega$$

(13)



(14) $K_U = \frac{U_0}{U_i} = -\frac{R_F}{R_1}$

$K_U = -6$ $R_1 = 2\,k\Omega$

$$-6 = -\frac{R_F}{2} \Rightarrow R_F = 12\,k\Omega$$

(15) $-10 = \frac{V_o}{1} \rightarrow V_o = -10\,V$

$10 = \frac{V_o}{1} \rightarrow V_o = +10\,V$

(16) $-10 = \frac{V_o}{3} \rightarrow V_o = -30V$

$10 = \frac{V_o}{3} \rightarrow V_o = 30V$

(17) $V_p = 200\,V \qquad V_{cp} = ?$

$V_{cp} = \frac{2}{\pi} V_p = 0,637 . 200 = 127,4V$

(18) $V_p = 200V \qquad V_{RMS} = ?$

$V_{RMS} = \frac{1}{\sqrt{2}} . V_p = \frac{1}{1,41} . 200 = 0,71 . 200 =$

$= 142V$

(19) $V_p = 100\,V \qquad F = 200\,Hz \qquad T = ?$

$T = \frac{1}{F} = \frac{1}{200} = 0,005s.$

(20)