

#1

$$I_D = \frac{V_S - 0,7}{R_D} = \frac{15 - 0,7}{1 \times 10^3} \Rightarrow \boxed{I_D = 14,3 \text{ mA}}$$

#2

$$V_{TH} = \frac{R_L}{R_S + R_L} \cdot V_S = \frac{2300}{220 + 2300} \cdot 20 = 18,25 \text{ V}$$

$$V_{TH} > V_Z \Rightarrow \text{"Ligado"} \Rightarrow V_Z = V_L$$

$$I_L = \frac{V_Z}{R_L} = \frac{10}{2300} \Rightarrow \boxed{I_L = 4,35 \text{ mA}}$$

$$I_S = \frac{V_S - V_Z}{R_S} = \frac{20 - 10}{220} = \boxed{45,45 \text{ mA}}$$

$$I_S = I_Z + I_L \Rightarrow I_Z = I_S - I_L = 45,45 \text{ mA} - 4,35$$

$$\boxed{I_Z = 41,1 \text{ mA}}$$

#3

$$N_1 = 500$$

$$N_2 = 5000$$

$$V_1 = 200 \text{ V}$$

$$V_2 = ?$$

$$V_2 = \frac{N_2}{N_1} \cdot V_1 = \frac{5000}{500} \cdot 200$$

$$\boxed{V_2 = 2000 \text{ V}}$$

#4

Ponte

15:1

$$R_L = 4,7 \text{ k}\Omega$$

$$V_1 = 220 \text{ V rms}$$

$$I_{CC} = ?$$

$$V_{P1} = \frac{V_1}{0,707} = \frac{220}{0,707} = 311,17 \text{ V}$$

$$V_{P2} = \frac{N_2}{N_1} \cdot V_{P1} = \frac{1}{15} \cdot 311,17 = 20,74 \text{ V}$$

$$V_0 = V_{P2} - 1,4 = 20,74 - 1,4 = 19,34 \text{ V}$$

$$V_{CC} = 0,636 \cdot V_0 = 0,636 \cdot 19,34 = 12,30 \text{ V}$$

$$I_{CC} = \frac{V_{CC}}{R_L} = \frac{12,30}{4,7 \times 10^3} \Rightarrow \boxed{I_{CC} = 2,62 \text{ mA}}$$