

$$\begin{aligned} \textcircled{1} \quad V_{p, \text{rec}} &= 24\sqrt{2} = 33,97 \text{ V} & V_{i, \text{max}} &= 33,97 - 0,41 = 33,23 \text{ V} \\ V_{i, \text{min}} &= 12 + 3 = 15 \text{ V} & V_{\text{end}} &= 33,23 - 15 = 18,23 \text{ V} \\ V_{\text{eq}} &= 33,23 - (18,23/2) = \boxed{24,12 \text{ V}} \end{aligned}$$

$$\begin{aligned} \textcircled{2} \quad V_{p, \text{rec}} &= 18\sqrt{2} = 25,46 \text{ V} & V_{i, \text{max}} &= 25,46 - 0,66 = 24,20 \text{ V} \\ V_{i, \text{min}} &= 12 + 3 = 15 & V_{\text{end}} &= 24,20 - 15 = 9,8 \text{ V} \\ V_{\text{eq}} &= 24,20 - (9,8/2) = \boxed{19,90 \text{ V}} \end{aligned}$$

$$\textcircled{B} V_{p,ac} = 19\sqrt{2} = 26,87 \text{ Vp} \quad V_{imax} = 26,87 - 0,67 = 26,20 \text{ V}$$

$$V_{imin} = 18 + 2 = 20 \text{ V} \quad V_{ord} = 26,2 - 21 = 5,2 \text{ V}$$

$$V_{c,ap} = 26,2 - (5,2/2) = \boxed{23,60 \text{ V}}$$

$$\textcircled{D} V_{p,ac} = 20\sqrt{2} = 28,28 \text{ Vp} \quad V_{imax} = 28,28 - 0,68 = 27,60 \text{ V}$$

$$V_{imin} = 6 + 3 = 9 \text{ V} \quad V_{ord} = 27,6 - 9 = 18,6 \text{ V}$$

$$V_{c,ap} = 27,6 - (18,6/2) = \boxed{18,30 \text{ V}}$$

$$\begin{aligned} \textcircled{5} \quad V_{psec} &= 18\sqrt{2} = 25,46 \text{ Vp} \quad V_{imax} = 25,46 - 0,56 = 24,90 \text{ V} \\ V_{imin} &= 6+3 = 9 \text{ V} \quad V_{ord} = 24,9 - 9 = \boxed{15,90 \text{ V}} \end{aligned}$$

$$\begin{aligned} \textcircled{6} \quad V_{psec} &= 22\sqrt{2} = 31,11 \text{ Vp} \quad V_{imax} = 31,11 - 0,6 = 30,51 \text{ V} \\ V_{imin} &= 18+3 = 21 \text{ V} \quad V_{ord} = 30,51 - 21 = \boxed{9,51 \text{ V}} \end{aligned}$$

$$\textcircled{1} V_{psec} = 22\sqrt{2} = 31,11 \text{ Vp} \quad V_{imax} = 31,11 - 0,65 = 30,46 \text{ V}$$

$$V_{imin} = 12 + 3 = 15 \quad V_{end} = 30,46 - 15 = 15,46 \text{ V}$$

$$I_{max} = \frac{1,86}{10} = 106 \text{ mA} \quad C = \frac{105 \text{ mm}}{60 \cdot 15,46} = \boxed{113,18 \mu\text{F}}$$

$$\textcircled{2} V_{psec} = -24\sqrt{2} = -33,94 \text{ Vp} \quad V_{imax} = -33,94 + 0,42 = -33,52 \text{ V}$$

$$V_{imin} = -12 - 3 = -15 \text{ V} \quad V_{end} = -33,52 - (-15) = -18,52 \text{ V}$$

$$V_{cap} = -33,52 - (-18,52/2) = \boxed{-24,11 \text{ V}}$$

$$\begin{aligned} ⑨ \quad V_{p,ac} &= -83\sqrt{2} = -32,53 \text{ Vp} & V_{i,max} &= -32,53 + 0,66 = -31,87 \text{ V} \\ V_{i,min} &= -5-3 = -8 \text{ V} & V_{p,d} &= -31,87 - (-8) = -23,87 \text{ V} \\ V_{o,q2} &= -31,87 - (-23,87/2) = \boxed{-19,93 \text{ V}} \end{aligned}$$

$$\begin{aligned} ⑩ \quad V_{p,ac} &= -19\sqrt{2} = -26,87 \text{ Vp} & V_{i,max} &= -26,87 + 0,44 = -26,43 \text{ V} \\ V_{i,min} &= -12-3 = -15 \text{ V} & V_{p,d} &= -26,43 - (-15) = \boxed{-11,43 \text{ V}} \end{aligned}$$