

1) Дано:

$$P = 250 \cdot 10^{-3} \text{ Вт}$$

$$U_m = 9 \text{ В}$$

$$Z_{\text{н}} = ?$$

Решение

$$P = \frac{U_m^2}{2Z_{\text{н}}} \Rightarrow Z_{\text{н}} = \frac{U_m^2}{2P} = \frac{81}{2 \cdot 250 \cdot 10^{-3}} = 162 \Omega$$

Ответ: 162Ω

Мехтегел
446-32 Б

2) Дано

$$Z_{\text{н}} = 1000 \Omega$$

$$Z_0 = 35 \Omega$$

$$\frac{U_{\text{макс}}}{U} = ?$$

Решение

$$\frac{U_{\text{макс}}}{U} = \rho + 1$$

$$\rho = \frac{Z_{\text{н}} - Z_0}{Z_{\text{н}} + Z_0} = \frac{1000 - 35}{1000 + 35} = 0,86 \Rightarrow \frac{U_{\text{макс}}}{U} = 1,86$$

Ответ: $1,86$

3) $L = 0,3 \cdot 10^{-6} \frac{\text{Гн}}{\text{м}}$

$$C = 37 \cdot 10^{-12} \frac{\text{Ф}}{\text{м}}$$

$$P = 1 \text{ Вт}$$

$$U_{\text{св}} = ?$$

$$P = \frac{U_m^2}{2\sqrt{\frac{L}{C}}} \Rightarrow U_{\text{св}} = U_m = \sqrt{2P\sqrt{\frac{L}{C}}} = \sqrt{2\sqrt{\frac{0,3 \cdot 10^{-6}}{37 \cdot 10^{-12}}}} = 12,209 \text{ В}$$

Ответ: $12,209 \text{ В}$

4) $L = 0,9 \cdot 10^{-6} \frac{\text{Гн}}{\text{м}}$

$$C = 90 \cdot 10^{-12} \frac{\text{Ф}}{\text{м}}$$

$$P = 10 \text{ Вт}$$

$$U_m = ?$$

$$P = \frac{U_m^2}{2\sqrt{\frac{L}{C}}} \Rightarrow U_m = \sqrt{2P\sqrt{\frac{L}{C}}} = \sqrt{20\sqrt{\frac{0,9 \cdot 10^{-6}}{90 \cdot 10^{-12}}}} = 20\sqrt{5} = 44,721 \text{ В}$$

Ответ: $44,721 \text{ В}$

5) $Z_0 = 50 \Omega$

$$Z_{\text{н}} = 100 \Omega$$

$$\frac{U_{\text{макс}}}{U_{\text{мин}}} = ?$$

$$\rho = \frac{Z_{\text{н}} - Z_0}{Z_{\text{н}} + Z_0} = \frac{50}{150} = \frac{1}{3}$$

$$U_{\text{св}} = \rho U_m$$

$$\frac{U_{\text{макс}}}{U_{\text{мин}}} = \frac{U_m + U_{\text{св}}}{U_m - U_{\text{св}}} = \frac{4}{2} = 2$$

Ответ: 2

6) $Z_0 = 35 \Omega$

$$Z_{\text{н}} = 50 \Omega$$

$$\frac{P_{\text{отр}}}{P_{\text{вх}}} = ?$$

$$\frac{P_{\text{отр}}}{P_{\text{вх}}} = |\rho|^2 = \left| \frac{Z_{\text{н}} - Z_0}{Z_{\text{н}} + Z_0} \right|^2 = 0,04$$

Ответ: $0,04$