

$$1. \quad V_{rms} = 6.3V \quad V_p = V_{rms} \cdot \sqrt{2} = 8.91V$$

$$a) \quad V_{omax} = V_p - V_{th} = \boxed{7.91V}$$

$$V_r = 0.25V = (V_p - V_{th}) T/RC \quad T = 1/60s \quad R = 0.5\Omega$$

$$b) \quad \cancel{RC} = \frac{(V_p - V_{th})T}{V_r R} = \cancel{0.25 \cdot 60 / 0.25} \quad 1.05F$$

$$c) \quad \cancel{V_{piv}} = 2V_p - V_{th} = \boxed{16.82V}$$

$$2. \quad V_{eo} = 3.3V \quad T = 1/60 \quad I_{eo} = \frac{V_p - V_{th}}{R} = 30A$$

$$V_p = V_o \cdot \sqrt{2}$$

$$R_o = V_o / I_o = 0.11\Omega$$

$$V_{th} = 0V$$

$$\omega = 60$$

$$C = \frac{V_p T}{V_r R}$$

$$V_r = \frac{1.5}{100} \cdot V_{eo}$$

$$\cancel{C} = \frac{V_p T}{V_r R} = \frac{3.3 \cdot 1/60}{0.015 \cdot 0.11} = \cancel{4.285F}$$

$$a) \quad C = I_o T / V_r = \frac{30 \cdot 1/60}{0.015 \cdot 3.3} = \boxed{10.1F}$$

$$b) \quad V_{piv} = 2V_p - V_{th} = \boxed{9.33V}$$

$$c) \quad \theta_c = \cos^{-1} \left(1 - \frac{V_r}{V_p} \right) = \cancel{31^\circ} = \boxed{0.54_{rad}}$$

$$\Delta T = \theta_c / \omega = \boxed{0.009s}$$