

1.

a) $\bar{\quad}$
+

b) $X_C = \frac{1}{\omega_0 C}$, $X_C = 100 \Omega$,

$$I_0 = \frac{V_{CC} - V_{BE}}{R_0} = 1 \text{ mA} \quad , \quad i_{C1max} = (1 + \beta_F) I_0 = 50 \text{ mA} \quad ,$$

ograničenje je strujno, $V_m = X_C i_{C1max} = 5 \text{ V}$.

c) $X_C = \frac{1}{\omega_0 C}$, $X_C = 1 \text{ k}\Omega$,

ograničenje je naponsko, $V_m = V_{CC} - V_{CES} - V_{BE} = 14.1 \text{ V}$

d) $v_{OUT} = -\frac{R_2}{R_1} v_{IN}$, $v_{OUT} = -1 \text{ V} \sin((1 \text{ krad/s})t)$

e) $v_{EI} = v_{OUT} = 5 \text{ V} \sin(\omega_0 t)$
 $i_{OUT} = v_{OUT} = 5 \text{ mA} \cos(\omega_0 t)$
 $v_{BI} = 5 \text{ V} \sin(\omega_0 t) + 0.7 \text{ V} \cdot h(\cos(\omega_0 t))$
 $v_{C2} = v_{BI} - V_{D2} = 5 \text{ V} \sin(\omega_0 t) - 0.7 \text{ V} \cdot h(-\cos(\omega_0 t))$
 $i_{C1} = 5 \text{ mA} \cos(\omega_0 t) \cdot h(\cos(\omega_0 t))$

f) $P_{D1} = V_D \overline{i_{D1}} = \frac{1}{\pi} 10 \text{ mA} 0.7 \text{ V} = 2.23 \text{ mW}$

g) $P_{Q1} = \frac{1}{2\pi} \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} (V_{CC} - v_{OUT}) i_{C1} dt = 47.75 \text{ mW}$

h) $P_{D2} = V_{D2} \overline{i_{D2}} = V_{D2} (\overline{I_0} - \overline{i_{BI}}) = 0.655 \text{ mW}$