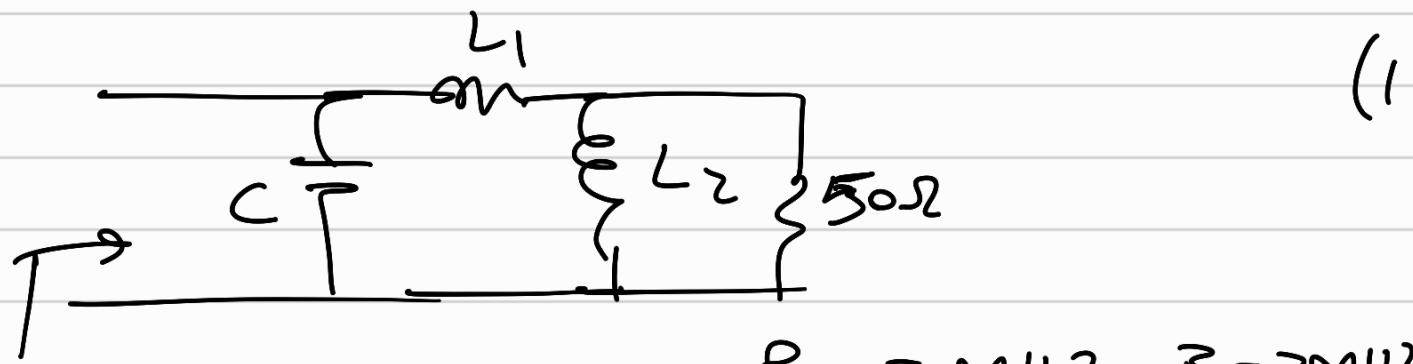


(سیکل) مدار اسلول >



$$R_t = 2 \text{ k}\Omega$$

$$f_0 = 50 \text{ MHz}, B = 2 \text{ MHz}$$

$$\alpha_t = \frac{f_0}{B} = \frac{50}{2} = 25$$

$$\alpha_t = R_t \omega_0 C = 2 \text{ k}\Omega \times 2\pi \times 50 \times 10^6 \times C = 25$$

$$C = 39.78 \text{ pF}$$

$$\alpha_t = \frac{R_t}{L_{eq} \omega_0} \Rightarrow L_{eq} = \frac{R_t}{\alpha_t \omega_0} = \frac{2000}{25 \times 2\pi \times 50 \times 10^6} = 0.254 \text{ H}$$

$$n = \frac{L_2}{L_1 + L_2}, \quad L_{eq} = L_1 + L_2$$

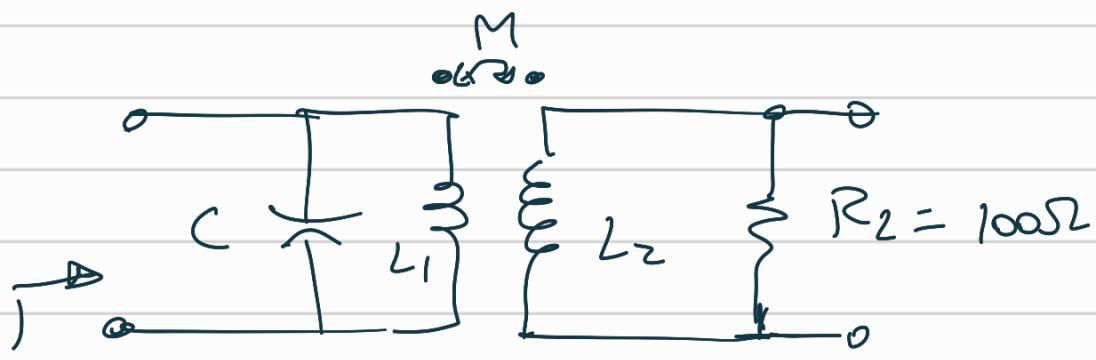
$$R_t = \frac{1}{n^2} R_L \Rightarrow n^2 = \frac{R_L}{R_t} = \frac{50}{2000} = \frac{1}{40}$$

$$n = \frac{1}{\sqrt{40}} = \frac{L_2}{L_1 + L_2} \Rightarrow \frac{L_1}{L_2} = 5.324$$

$$L_{eq} = L_1 + L_2 = 0.254 \mu\text{H} \quad \rightarrow \quad L_2 = 40 \text{ nH}$$

$$L_1 = 212.96 \text{ nH}$$

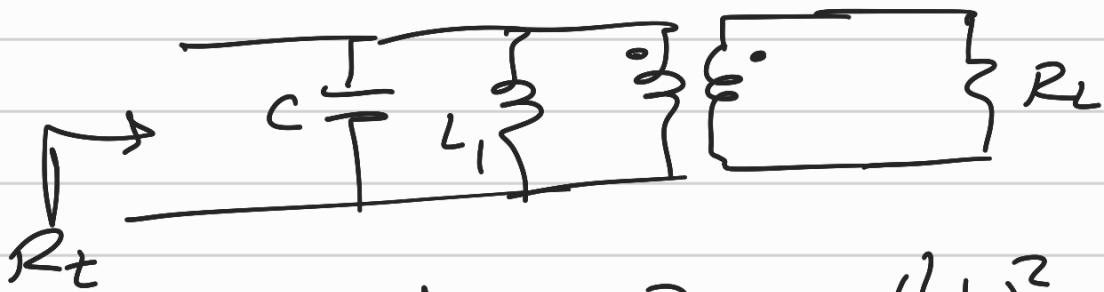
(r)

 R_t

$$L_1 = 1 \mu\text{H}, L_2 = 0.5 \mu\text{H}, M = 0.35 \mu\text{H}$$

$$, C = 100 \text{ pF}$$

$$l = M/L_1$$



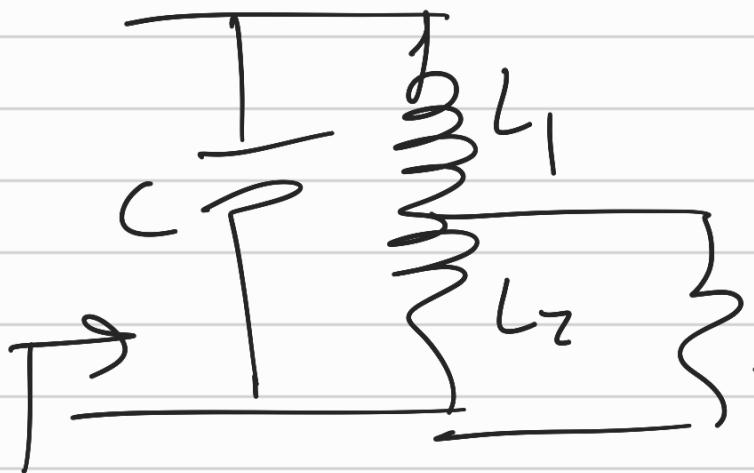
$$R_L = \frac{1}{(M/L_1)^2} R_L = \left(\frac{L_1}{M}\right)^2 R_L$$

$$R_L = \frac{1}{0.35} \times 100 = 285.71 \Omega$$

$$f_o = \frac{1}{2\pi\sqrt{L_1 C}} = \frac{1}{2\pi\sqrt{10^{-6} \times 100 \times 10^{-12}}} = 15.91 \text{ MHz}$$

$$\beta = \frac{f_o}{Q_t} = \frac{15.9 \text{ MHz}}{2.859} = 5.56 \text{ MHz}$$

$$Q_t = \frac{R_t}{\omega_0 L_1} = \frac{285.71}{2\pi \times 15.9 \times 10^6 \times 10^{-6}} = 2.859$$



$$\omega_0 = 10^8 \text{ rad/sec} (\text{Hz})$$

$$BW = 5 \times 10^6 \text{ rad/sec}$$

$$SR_L = 100\Omega$$

$$k = 0.7$$

$Z \times k$

$$1 : M/L_1$$



$$R_t = \left(\frac{L_1}{M} \right)^2 R_L \Rightarrow \left(\frac{L_1}{M} \right)^2 = \frac{2000\Omega}{100\Omega} = 20$$

$$\frac{L_1}{M} = \sqrt{20}$$

$$\mathcal{Q}_t = \frac{\omega_0}{BW} = \frac{10^8}{5 \times 10^6}$$

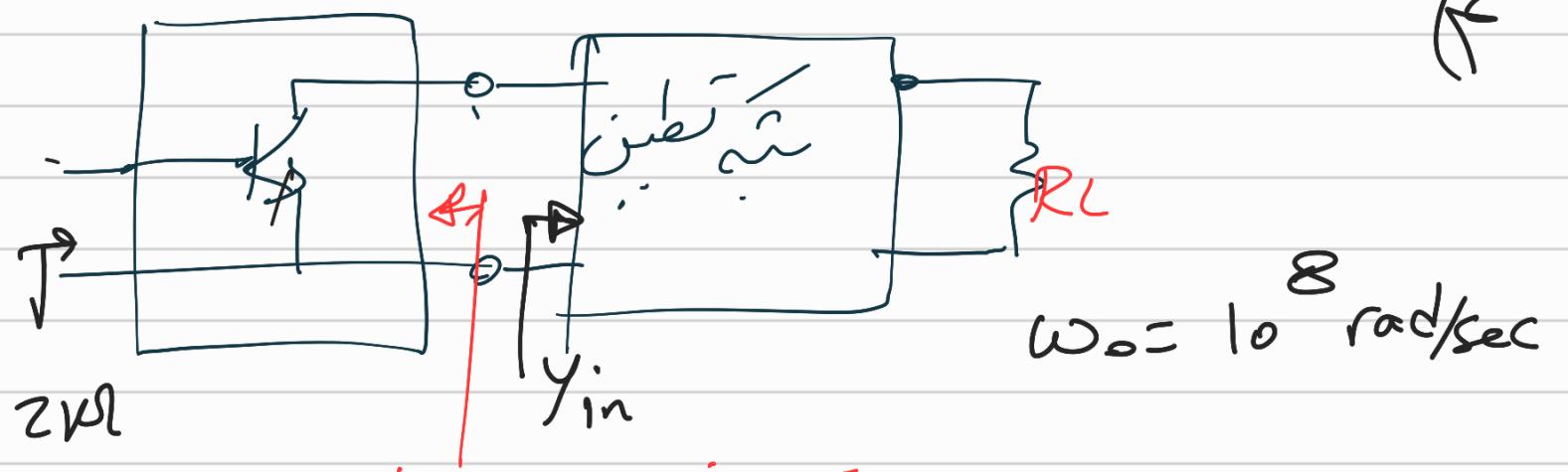
$$\mathcal{Q}_t = 20$$

$$\mathcal{Q}_t = \frac{R_t}{\omega_0 L_1} = R_t \omega_0 C$$

$$L_1 = \frac{R_t}{\mathcal{Q}_t \omega_0} = 1 \mu H \quad C = \frac{\mathcal{Q}_t}{R_t \omega_0} = 100 \text{ PF}$$

$$M = \frac{L_1}{\sqrt{20}} = \frac{1}{\sqrt{20}} = 0.223 \mu H$$

$$K = \frac{M}{\sqrt{L_1 L_2}} = 0.7 \quad L_1 L_2 = 0.10 \mu H \quad L_1 = 1 \mu H = 100 \text{ mH} \quad L_2 = 10 \mu H$$



$$Y_o = 1m\Omega + j0.5m\Omega$$

$$R_L = 100\Omega$$

$$G_S = 1m\Omega$$

$$Y_{in} = 1m\Omega - j0.5m\Omega$$

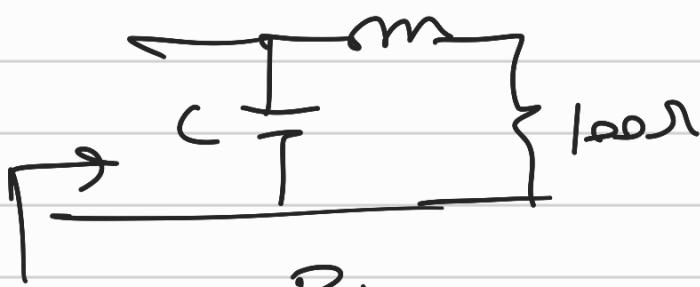
$$G_L = 10m\Omega$$

ارسال زدیده شود

کلیک باز روی رزترنگر

$$G_S < G_L$$

لـ سار تطبیق فعـ 1، 1 مـ تواریخ رـ



$$Y_{in} = \frac{R_L}{R_L^2 + L^2\omega^2} + j\left(C\omega - \frac{L\omega}{R_L^2 + L^2\omega^2}\right)$$

$$\left\{ \begin{array}{l} \frac{R_L}{R_L^2 + L^2\omega^2} = 1m\Omega \\ C\omega - \frac{L\omega}{R_L^2 + L^2\omega^2} = -0.5m\Omega \end{array} \right.$$

$$\omega = \omega_0 = 10^8 \text{ rad/sec}$$

$$C\omega - \frac{L\omega}{RL/1m\Omega} = -0.5m\Omega$$

$$10^8(C - L \times 10^{-5}) = -0.5 \times 10^{-3}$$

$$10^4 + 10^{16}L^2 = 10^5 \Rightarrow L = 3\mu H$$

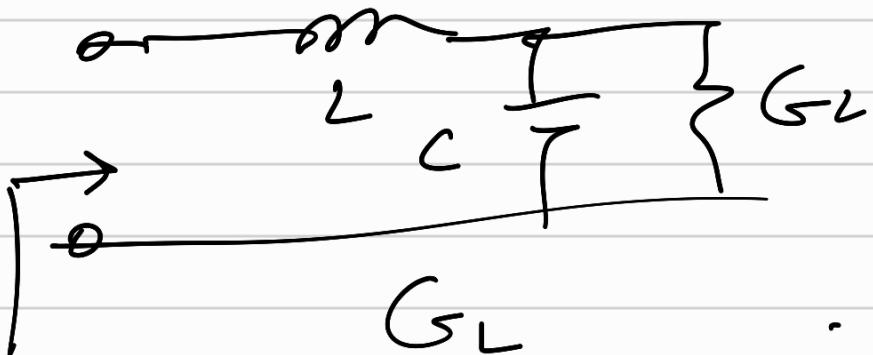
$$C = -0.5 \times 10^{-11} + 3 \times 10^{-11}$$

$$C = 2.5 \times 10^{-11} = 25 \text{ pF}$$

$$\rightarrow R_L = 2 \text{ k}\Omega \rightarrow G_L = 0.5 \text{ m}\Omega$$

$$G_S = 1 \text{ m}\Omega$$

$G_S > G_L$
عراقي، مصري، وإنجليزي



$$Z_{in} = \frac{G_L}{G_L^2 + C^2\omega^2} \rightarrow \left(\frac{C\omega}{G_L^2 + C^2\omega^2} - L\omega \right)$$

$$\frac{G^2}{G^2 + C^2 \omega^2} = R_S = 1 \text{ k}\Omega$$

$$\frac{0.5 \times 10^{-3}}{(0.5 \times 10^{-3})^2 + C^2 \times 10^{-16}} = 1000$$

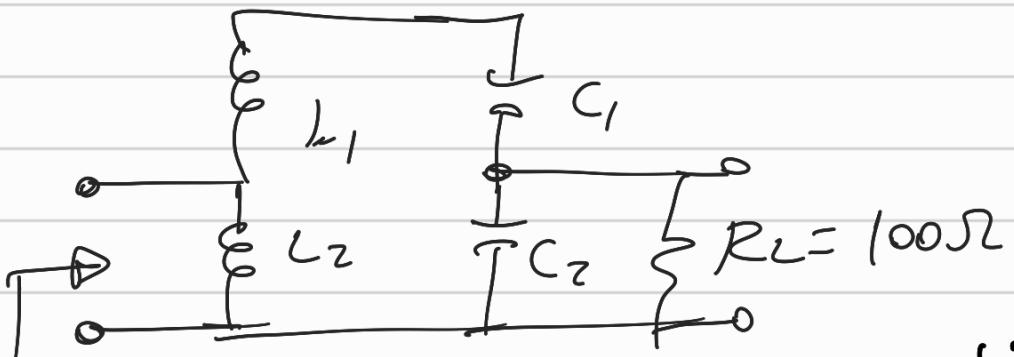
$$C^2 = \frac{0.5 \times 10^{-6} - 0.25 \times 10^{-6}}{10^{-16}} \Rightarrow C = 5 \mu F$$

$$-j \left(\frac{C\omega}{G_L^2 + C^2 \omega^2} - L\omega \right) = \frac{-1}{j 0.5 \times 10^{-3}}$$

$$-\left(\frac{C\omega}{G_L^2 + C^2 \omega^2} - L\omega \right) = 2000$$

$$-\left(\frac{5 \times 10^{-12} \times 10^{-8}}{0.25 \times 10^{-6} + 25 \times 10^{-24} \times 10^{-16}} - L \times 10^{-8} \right) = 2000$$

$$L = \frac{2000 + \frac{5 \times 10^{-4}}{0.5 \times 10^{-6}}}{10^{-8}} = 2100 \times 10^{-8} = 21 \mu H$$



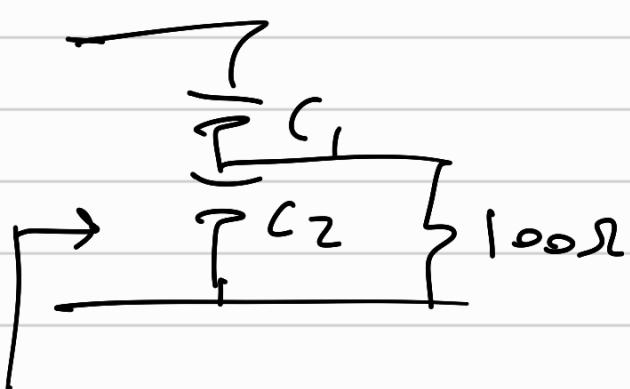
(a)

$$\omega_0 = 10^8 \text{ rad/sec}$$

$$BW = 0.5 \times 10^7 \text{ rad/sec}$$

R_t

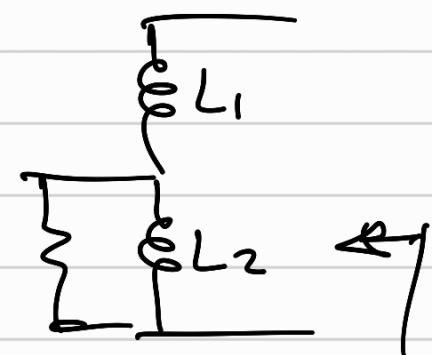
$$200\Omega$$



$$R = 1k\Omega$$

①

مفترض



$$R_t = 200\Omega$$

②

$$R = 1k\Omega$$

$$Q_t = \frac{\omega_0}{BW} = \frac{10^8}{0.5 \times 10^7} = 20$$

$$n = \sqrt{\frac{100\Omega}{1000\Omega}} = \sqrt{\frac{1}{10}} = \frac{c_1}{c_1 + c_2} \Rightarrow \frac{c_2}{c_1} = 2.16$$

① ω

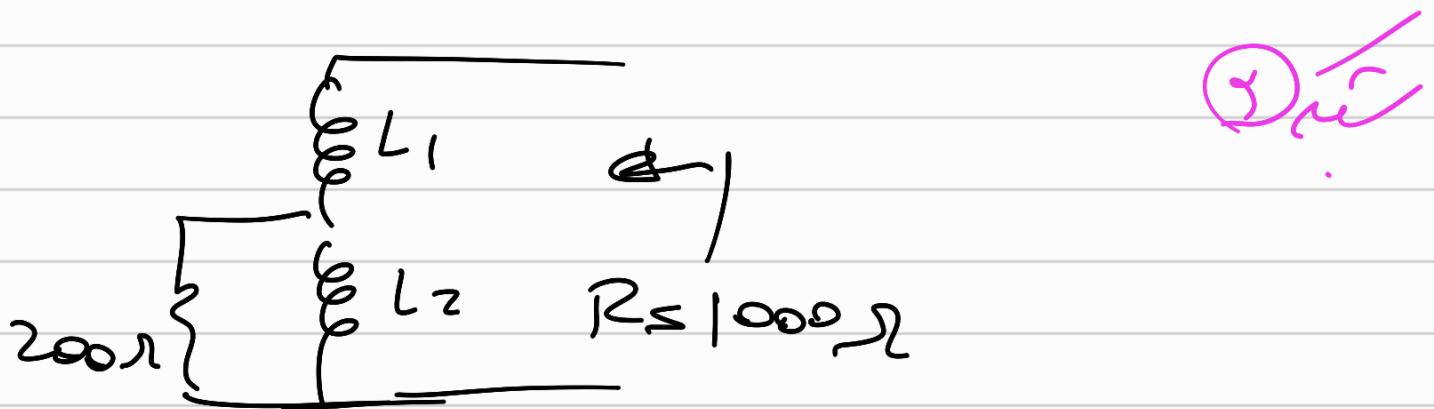
$$Q_t = R_{eq} \omega_0 = 100 \times 10^8 \times 10 = 20$$

$$C_{eq} = \frac{20}{10^11} = 200 \text{ PF} = \frac{c_1 c_2}{c_1 + c_2} \Rightarrow Q_t = 292.6 \text{ PF}$$

$$c_2 = 632 \text{ PF}$$

$$\omega_0 = \frac{1}{\sqrt{L_{\text{eq}} C}} = 10^8 \text{ rad/s} \quad L = \frac{1}{10^6 \times 200 \times 10^{-12}}$$

$$L = 0.5 \mu\text{H}$$



$$n = \frac{L_2}{L_1 + L_2} = 0.447 \Rightarrow \frac{L_2}{L_1} = 2.236$$

$$n = \sqrt{\frac{200 \Omega}{1000 \Omega}} = \sqrt{\frac{1}{5}} = 0.447$$

$$L = L_2 + L_1 = 0.5 \mu\text{H}$$

$$\textcircled{1} \Delta \mu \text{ will be } 1$$

$$L_1 = 0.154 \mu\text{H}$$

$$L_2 = 0.346 \mu\text{H}$$