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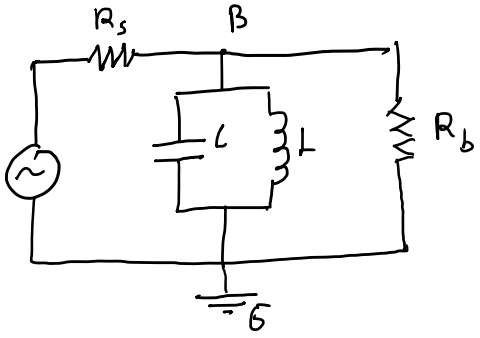

$A = 10$ Volt

$L = 3,96 \times 10^{-9}$ Henry $= 3,96$ nH

$C = 0,64 \times 10^{-9}$ Farad $= 0,64$ nF

$R_s = 100\ \Omega$

$R_b = 75\ \Omega$

1. Daya pada frekuensi resonansi (99,973 MHz):

$$P_{R_b} = \left(\left| \frac{Z_{BG}}{Z_{BG} + R_s} \right| A \right)^2 \cdot \frac{1}{2R_b} = \left(\frac{R_b}{R_b + R_s} A \right)^2 \cdot \frac{1}{2R_b} = \frac{A^2 \cdot R_b}{2(R_b + R_s)^2}$$

$$P_{R_b} = \frac{10^2 \cdot 75}{2(75 + 100)^2} = 0,122\ W$$

2. Daya pada beban mencapai maksimum (P max) pada frekuensi berapa?

$P = V_{rms} \cdot I_{rms} = I_{rms}^2 \cdot R \rightarrow P_{R_b} = I_{rms}^2 \cdot R_b$

Agar P_{R_b} mencapai maksimum maka nilai I_{rms} yang melewati R_b juga harus max.

Agar I_{rms} maksimum maka $Z_{LC} \approx \infty$

$$Z_{LC} = j \frac{\frac{L}{C}}{\frac{1}{\omega C} - \omega L} \approx \infty$$

$\therefore \frac{1}{\omega C} = \omega L \rightarrow$ Frekuensi Resonansi $= 99,973$ MHz

3. Bila R_b diganti dengan sebuah lampu dengan besar resistansi $75\ \Omega$, pada frekuensi berapa lampu menyala paling terang?

$\therefore$ Pada frekuensi resonansi (99,973 MHz) karena pada saat itu daya yang diserap oleh beban (lampu) mencapai maksimum.

4. Daya pada beban pada frekuensi 105 MHz ?

$$Z_{LC} = j\frac{\frac{L}{C}}{\frac{1}{\omega C} - \omega L} = j\frac{\frac{3,96\,nH}{0,64\,nF}}{\frac{1}{2\pi f.0,64nF} - 2\pi f.3,96\,nH} \quad ; f = 105 \times 10^6\ Hz$$

$$Z_{LC} = j\frac{6,19}{2,37 - 2,61}$$

$$Z_{LC} = -j25,79 \rightarrow \text{Asumsikan } x = -25,79$$

$$Z_{BG} = \frac{x^2 R_b}{R_b^2 + x^2} + j\frac{x.R_b^2}{R_b^2 + x^2}$$

$$Z_{BG} = \frac{(-25,79)^2.75}{75^2 + (-25,79)^2} + j\frac{(-25,79).75^2}{75^2 + (-25,79)^2}$$

$$Z_{BG} = 7,93 - j23,06$$

$$V_{Rb} = \left|\frac{Z_{BG}}{Z_{BG} + R_s}\right|.A = \left|\frac{7,93 - j23,06}{7,93 - j23,06 + 100}\right|.10$$

$$V_{Rb} = \left|\frac{7,93 - j23,06}{107,93 - j23,06}\right|.10$$

$$V_{Rb} = \left|\frac{7,93 - j23,06}{107,93 - j23,06} \times \frac{107,93 + j23,06}{107,93 + j23,06}\right|.10$$

$$V_{Rb} = \left|\frac{1387,65 - j2306}{12180,65}\right|.10$$

$$V_{Rb} = |0,114 - j0,189|.10$$

$$V_{Rb} = 0,22.10$$

$$V_{Rb} = 2,2\ Volt$$

$$P_{Rb} = \frac{V_{Rb}^2}{2Rb} = \frac{2,2^2}{2.75} = 0,032267\ Watt$$