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1. Dik: $R_s = 2 \text{ k}\Omega$

$f = 50 \text{ MHz}$

$R_L = 100 \Omega$

Isyarat: meloloskan sinyal DC

Dit: Rangkaian IMC

Jawab:

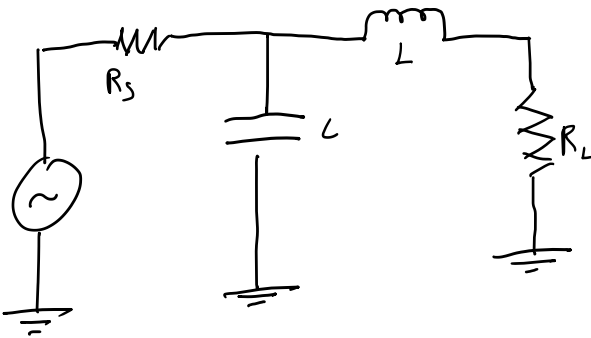
Meloloskan sinyal DC \rightarrow bersyarat LPF

karena $R_L < R_s$, maka:

$$R_p = R_s = 2000 \Omega$$

$$R_s = R_L = 100 \Omega$$

$$Q_s = Q_p = \sqrt{\frac{R_p}{R_s} - 1} = \sqrt{\frac{2000}{100} - 1} = \sqrt{19}$$



$$Q_s = \frac{X_s}{R_s} \rightarrow X_s = Q_s \cdot R_s$$

$$2\pi f L = Q_s \cdot R_s$$

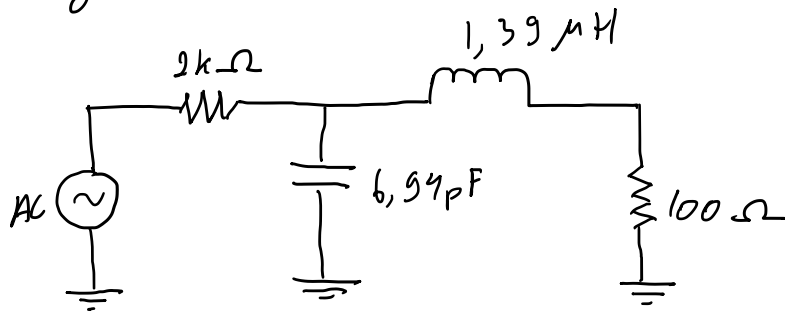
$$L = \frac{Q_s \cdot R_s}{2\pi f} = \frac{\sqrt{19} \cdot 100}{2 \cdot 3,14 \cdot 50 \times 10^6} = 1,39 \times 10^{-6} \text{ H} \\ = 1,39 \mu\text{H}$$

$$Q_p = \frac{R_p}{X_p} \rightarrow X_p = \frac{R_p}{Q_p}$$

$$\frac{1}{2\pi f C} = \frac{R_p}{Q_p}$$

$$C = \frac{Q_p}{2\pi f R_p} = \frac{\sqrt{19}}{2 \cdot 3,14 \cdot 50 \times 10^6 \cdot 2000} = 6,94 \text{ pF}$$

Rangkaian IMC :



2. Dik: $R_s = 2k\Omega$
 $R_L = 100\Omega$

$f = 50 \text{ MHz}$

Sifat: memblokir sinyal DC

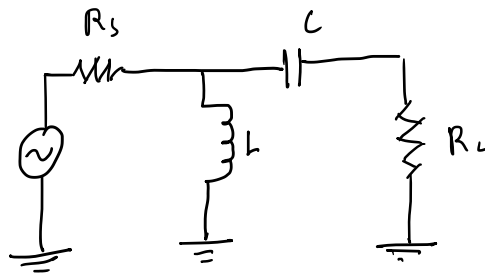
Dit: Rangkaian IMC

Jawab:

Sifat \rightarrow HPF

$R_p = R_s = 2000\Omega$

$R_s = R_L = 100\Omega$



$$Q_s = Q_p = \sqrt{\frac{R_p}{R_s} - 1} = \sqrt{\frac{2000}{100} - 1} = \sqrt{19}$$

$$Q_s = \frac{X_s}{R_s} \rightarrow X_s = Q_s \cdot R_s$$

$$\frac{1}{2\pi f C} = Q_s \cdot R_s$$

$$C = \frac{1}{2\pi f Q_s R_s} = \frac{1}{2 \cdot 3,14 \cdot 50 \times 10^6 \cdot \sqrt{19} \cdot 100} = 7,3 \text{ pF}$$

$$Q_p = \frac{R_p}{X_p} \rightarrow X_p = \frac{R_p}{Q_p}$$

$$2\pi f L = \frac{R_p}{Q_p}$$

$$L = \frac{R_p}{2\pi f \cdot Q_p} = \frac{2000}{2 \cdot 3,14 \cdot 50 \times 10^6 \cdot \sqrt{19}} = 1,46 \text{ μH}$$

Rangkaian IMC :

