



- [1] Draw the normalized resonance curves for the current in a series resonance circuit having a quality factor $Q_s = 20$ in the narrow band near resonance (for $\delta = +1\%$, $+2\%$,, $+5\%$). Plot the phase angle of the current in the same band and show the effect of increasing Q_s .
- [2] In a series resonance circuit $L = 65 \text{ mH}$, $C = 1.56 \text{ nF}$ and $R = 5.1 \Omega$, calculate the resonance frequency, the quality factor of the circuit, the bandwidth and the impedance of the circuit at frequencies 1% and 10% above resonance.
- [3] For the circuit shown in Fig. 1, calculate the frequency at which series resonance occurs (the input impedance is real). At what value of the conductance G will it be impossible to obtain resonance?
- [4] A generator is connected to a series oscillating circuit has a frequency of 250 KHz. The oscillating circuit has a constant $L = 600 \mu\text{H}$, $R = 30 \Omega$ and a variable capacitor C . For which value of the capacitor C will the circuit be at resonance? and for which value of frequency will the current flowing through the circuit decrease to one fourth of its value at resonance.
- [5] The cutoff frequencies of a series resonance circuit are 5600 and 6000 Hz :
- Calculate the B.W. of the circuit and Q_s .
 - If the resistance of the circuit is 2Ω , calculate X_L , X_C , L and C at resonance.
- [6] A series resonance circuit has a resonance frequency of 10 KHz. The resistance of the circuit is 5Ω and X_C at resonance is 200Ω , find :
- The Bandwidth and the cutoff frequencies.
 - Q_s of the circuit.
 - The voltage across the coil and the capacitor at resonance and at a frequency 10% below resonance if the input voltage is $30 \angle 0^\circ$.
 - The power dissipated in the circuit at resonance and at a frequency 4% above resonance.
- [7] Design a series resonance circuit with an input voltage $5 \angle 0^\circ \text{ V}$ to have the following specifications :
- A peak current of 500 mA.
 - A Bandwidth of 120 Hz.
 - A resonance frequency of 8400 Hz.

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Calculate the circuit elements and the cutoff frequencies .

18] A series resonance circuit of L, C and R is required to be at resonance at a frequency of 1 MHz . Its Bandwidth is 5 KHz and its input impedance at resonance is 50Ω . Calculate L, C and R .

19] Make the necessary derivations to sketch the magnitude of the current I shown in Fig.2 in amperes against frequency in Hertz showing its value at the resonance frequency F_s and the cutoff frequencies F_1 and F_2 , hence , prove that : $F_s = \sqrt{F_1 F_2}$.

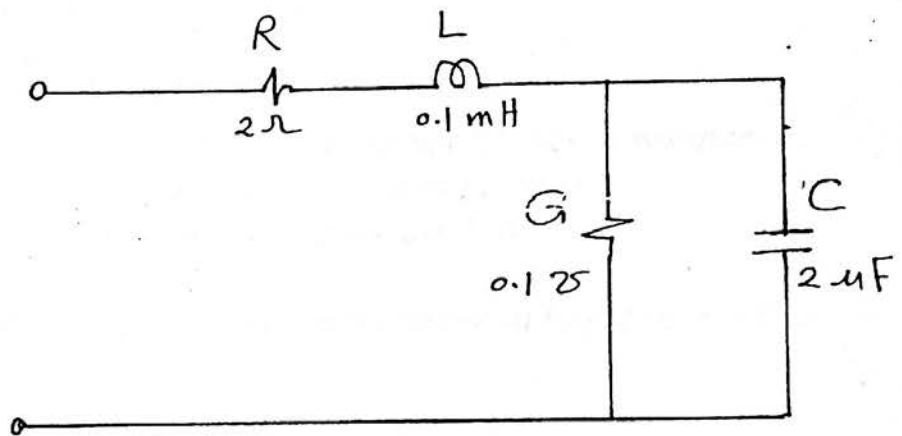


Fig.1

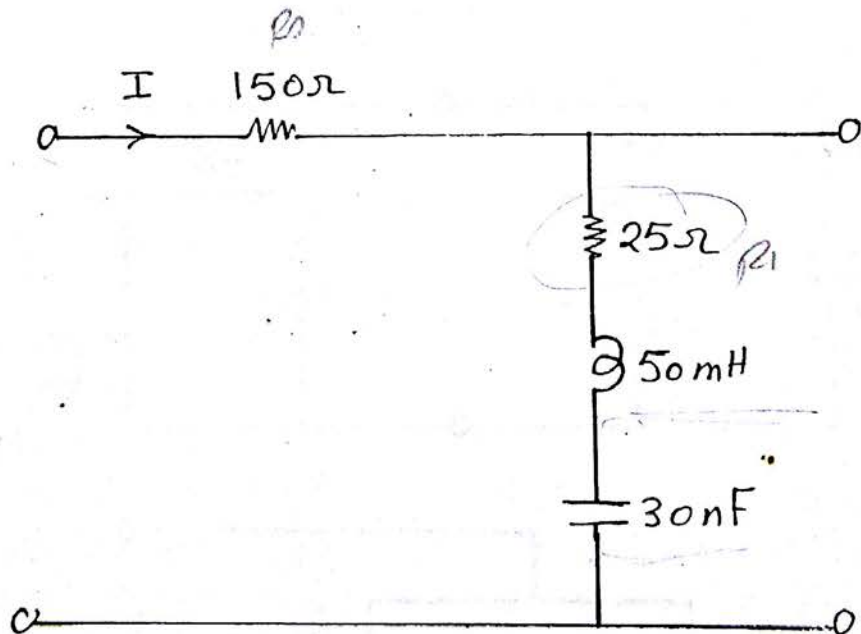


Fig.2