Jaypee Institute of Information Technology
Electronics & Communication Engineering
Electrical science – L (15B11EC111)

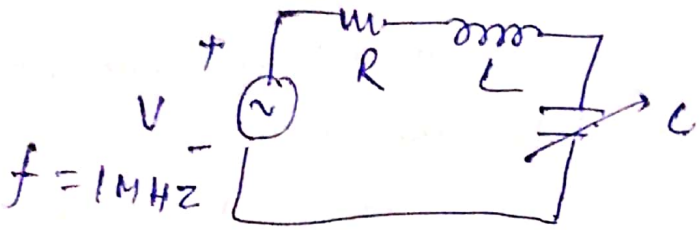
Tutorial 8

Que 1 [C03] A series resonance network, consisting of a resistor of 30Ω, a capacitor of 2 μF and an inductor of 20 mH is connected across a sinusoidal supply voltage which has a constant output of 9 volts at all frequencies. Calculate, the resonant frequency, the ~~Circuit at~~ Current at resonance, the voltage across the inductor and capacitor at resonance, the quality factor and band width of the circuit. Also find the upper and lower -3dB frequency points f_H & f_L.

Que 2. [C03] A series circuit consists of a resistance of 4Ω, an inductance of 500 mH and a variable capacitance connected across a 100 V, 50 Hz supply. Calculate the capacitance required to produce a series resonance condition and the voltage generated across both the inductor and the capacitor at the point of resonance.

Que 3 [C03] A parallel resonance network, consisting of a resistor of 60Ω, a capacitor of 120 μF and an inductor of 200 mH is connected across a sinusoidal supply voltage which has a constant output of 100 volts at all frequencies. Calculate, the resonant frequency, the quality factor and bandwidth of the circuit, the circuit current at resonance hence...

Qn 4. [CO3] A constant voltage of frequency, 1MHz is applied to a lossy inductor (r in series with L), in series with a variable capacitor C (Fig below). The current drawn is maximum when C = 400 pF, while current is reduced to $(\frac{1}{\sqrt{2}})$ of the above value, when C = 450 pF. Find the value of r and L. Calculate the quality factor of the coil and the bandwidth.



Qn 5. [CO3] A coil having a resistance of 15Ω and an inductance of 0.75H, is connected in series with a capacitor (Fig 5.1). The circuit draws maximum current, when a voltage of 200V at 50Hz is applied. A second capacitor is then connected in parallel to the circuit (Fig 5.2). what should be its value such that the ~~condition~~ combination acts like a non-inductive resistance, with same voltage (200V) at 100Hz? Calculate the current drawn by the two circuits too.

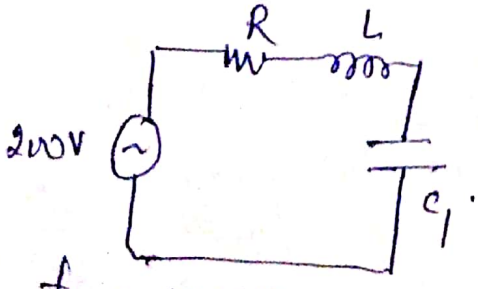


Fig 5.1