1. An R–L–C series circuit has R = 10 Ω, L = 0.1 H, and C = 8 mf. Calculate the following:
2. resonant frequency;
3. Q-factor of the circuit at resonance;
4. half-power frequencies and bandwidth.
5. A resistor, a variable iron-core inductor, and a capacitor are connected across a 230 V, 50 Hz supply. By varying the position of the iron core inside the inductor coil, its inductance is changed. Maximum current of 1.5 A was obtained in the circuit by changing the inductance of the coil. At that time the voltage across the capacitor was measured as 600 V. Calculate the values of circuit parameters.
6. An inductive coil has a resistance of 2.5 Ω and an inductive reactance of 25 Ω. This coil is connected in series with a variable capacitance and a voltage of 200 V at 50 Hz is applied across the series circuit. Calculate the value of C at which the current in the circuit will be maximum. Also calculate the power factor, impedance, and current in the circuit under that condition.
7. An inductor, a variable capacitor, and a resistor are connected in series across a constant voltage, 100 Hz power supply. When the capacitor value is fixed at 100 mF, the current reaches its maximum value. Current gets reduced to half its maximum value when the capacitor value is 200 mF. Calculate the values of circuit parameters and the Q-factor of the circuit.