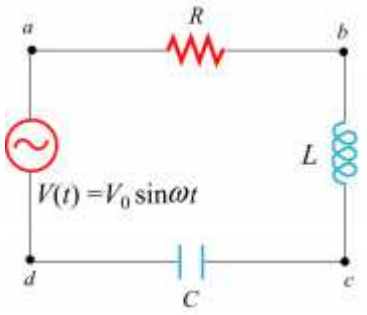
Assignment -2

Module II: Alternating Current Circuits

1. Define the following
   (i) RMS Value (ii) Average Value (iii) Instantaneous Value (iv) Real power (v) Apparent power (vi) Reactive power (vii) Frequency (viii) Balanced three phase circuit
2. A series circuit has R=10Ω, L=50mH, and C=100μF and is supplied with 200V, 50Hz. Find (i) Impedance (ii) current (iii) power (iv) power factor (v) voltage drop across the each element.
3. A coil of resistance 10 Ω and inductance 0.1 H is connected in series with a 150 μF capacitor across 200V, 50 Hz supply. Calculate (i) Inductive reactance, Capacitance reactance, impedance, current and power factor. (ii) The voltage across the coil and capacitor respectively.
4. A series circuit having pure resistance of 40 Ω, pure inductance of 50mH and a capacitor is connected across a 400V, 50 Hz ac supply. This LC circuit draws a current of 10A. Calculate (i) Power factor of the circuit, (ii) Capacitor value.
5. Derive the expression for impedance, phase angle, power factor, current, voltage, reactance, apparent power, real power and reactive power for RC series circuit. .
6. Suppose an AC generator with V(t) = 150 sin (100t) is connected to a series RLC circuit with R = Ω 40.0 , L = 80.0 mH , and C = 50.0 μF



   (a) Calculate V_R, V_L, V_c and, the maximum of the voltage drops across each circuit element.
   (b) Calculate the maximum potential difference across the inductor and the capacitor between point b and d
7. A sinusoidal voltage V(t) = 200sinωt is applied to a series RLC circuit with L =10.0 mH , C =100 nF and R = 20.0 Ω . Find the following quantities: (a) the resonant frequency, (b) the amplitude of the current at resonance, (c) the quality factor Q of the circuit, and 12-28 (d) the amplitude of the voltage across the inductor at the resonant frequency.
8. A coil of resistance 10Ω and inductance 0.1 H is connected in series with a 150 μF capacitor across a 200 V, 50 Hz supply. Calculate the voltage across the coil and the capacitor respectively.
9. A circuit is composed of a resistance 6 Ω and a series capacitive reactance of 8 Ω. A voltage E(t)=141 sin 314t is supplied to the circuit. Find (i) Complex impedance, (ii) Effective value of current, (iii) Power delivered to the circuit, (iv) Capacitance of the capacitor.