Module 2 : AC Circuits 6 Hrs

Alternating voltages and currents, RMS, average, form factor, peak factor; Single phase RL, RC, RLC series and parallel circuits; Power and power factor; Balanced three phase systems

Course Outcome

- Evaluate AC circuit parameters using laws

Problems

A coil of resistance 10 Ω and inductance 0.1 H is connected in series with a 150 μF capacitor across 200 V, 50 Hz supply. Calculate (i) inductive reactance, capacitive reactance, impedance, current and power factor and (ii) the voltage across the coil and capacitor respectively (iii) real, reactive and apparent power (iv) Prove that the supply voltage is equal to the total voltage drop across all the elements and draw the phasor diagram.

Steps

- Write the given data
- Find X_L and X_C
- Find impedance Z
- Find current I
- Find power factor
- Find the drop across R, L and C

A series RLC circuit containing a resistance of 12 Ω, an inductance of 0.15 H and a capacitor of 100 μF are connected in series across a 100 V, 50 Hz supply. Calculate the total circuit impedance, the circuit current, power factor and draw the voltage phasor diagram.

A resistance R, an inductance L=0.5 H and a capacitance C are connected in series. When a voltage v=350 cos(3000t-20°) V is applied to this series combination, the current flowing is 15 cos(3000t-60°) A. Find R and C

A 230 V, 50 Hz voltage is applied to a coil of L = 5H and R = 2 Ω in series with a capacitance C. What value must C have in order that the voltage across the coil shall be 250 V.

In the circuit shown in Fig., at a frequency f=500 Hz, the current leads the voltage by 50º. Find R and voltage across each circuit element. Draw the phasor diagram