# Ch—07 Alternating Current

## Daily Practice Problem 06

**Q1.** Determine the impedance of a series LCR-circuit if the reactance of $C$ and $L$ are $250\ \Omega$ and $220\ \Omega$ respectively and $R$ is $40\ \Omega$.

**Q2.** A resistor of $12\ ohm$, a capacitor of reactance $14\ ohm$ and a pure inductor of inductance $0.1\ henry$ are joined in series and placed across a $200\ volt$, $50\ Hz$ a.c. supply. Calculate

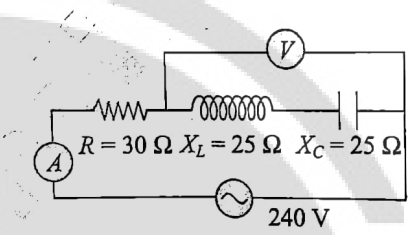
**(i)** the current in the circuit and

**(ii)** the phase angle between the current and the voltage. Take $\pi = 3$ for purpose of calculations.

**Q3.** A $50\ \mu F$ capacitor, $0.05\ H$ inductor and a $48\ \Omega$ resistor are connected in series with an a.c. source of emf, $\epsilon = 310\ sin\ 314\ t$. Calculate the reactance of the circuit and tell its nature. What is the phase angle between the current and the applied emf?

**Q4.** A $12\ \Omega$ resistance and an inductance of $0.05 / \pi\ H$ with negligible resistance are connected in series. Across the ends of this is connected a $130\ V$ alternating voltage of frequency $50\ Hz$. Calculate the alternating current in the circuit and the potential difference across the resistance and across the inductance.

**Q5.** In the circuit shown in the figure neglecting source resistance the voltmeter and ammeter reading will respectively, will be




**a.** 0 V, 3 A

**b.** 150 V, 3 A

**c.** 150 V, 6 A

**d.** 0 V, 8 A

**Q6.** An LCR-series circuit with $L = 100\ mH$, $C = 100\ \mu\ F$, $R = 120\ \Omega$. is connected to an a.c. source of emf $\epsilon = 30\ sin\ 100\ t\ volt$. Find the impedance, peak current and resonant frequency of the circuit.

**Q7.** A circuit connected to an AC source of emf $e = e_0\ sin(100t)$ with $t$ in seconds, gives a phase difference of $\frac{\pi}{4}$: between the emf $e$ and current $i$. Which of the following circuits will exhibit this?

**a.** $RC$ circuit with $R = 1\ k\Omega$ and $C = 1\ \mu F$

**b.** $RL$ circuit with $R = 1\ k\Omega$ and $L = 1\ mH$

**c.** $RC$ circuit with $R = 1\ k\Omega$ and $C = 10\ \mu F$

**d.** $RL$ circuit with $R = 1\ k\Omega$ and $L = 10\ mH$

## ANSWERS

**1.** $50\ \Omega$

**2.** $10\ A,\ \ 53.1°$

**3.**
$48\ \Omega,\ \ 45°(current\ leads\ voltage)$

**4.** $10\ A,\ 120\ V,\ 50\ V$

**5.** d

**6.** $150\ \Omega,\ 0.2\ A,\ 50\ Hz$

**7.** c