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EASTERN UNIVERSITY, SRI LANKA
FIRST EXAMINATION IN SCIENCE - 2007/2008
SECOND SEMESTER (PROPER/REPEAT)
(August/September 2009)
PH 104 AC THEORY



Time: 01 hour.

Answer ALL Questions

1. An inductor with inductance L is connected across an AC supply of frequency f . Derive an expression for its inductive reactance.
If a resistance R is connected in series with the inductor L , draw an impedance-phasor diagram for this circuit and find,
- Circuit impedance of the circuit
 - Phase angle of the circuit.

A coil having inductance $L = 0.1H$ and resistance $R = 10\Omega$ is connected in series across a $50Hz$, $120V$ supply. Calculate,

- Inductive reactance
 - Impedance of the circuit
 - Current in the circuit
 - The voltage across the inductor
 - The phase angle.
- 2 An LCR series circuit is connected across an $a.c$ power supply of voltage V with angular frequency ω . Find the expression for *resonant frequency* of the circuit.

A series LCR circuit has $L = 0.2H$, $C = 0.5\mu F$ and $R = 500\Omega$. The circuit is connected across a $100V$ $a.c$ power supply. At resonance, find,

- The resonant frequency
- The inductive, capacitive reactances and the impedance of the circuit.
- The current in the circuit.
- The potential differences across each circuit element.
- The Q -factor of the circuit.