

EASTERN UNIVERSITY, SRI LANKA
FIRST EXAMINATION IN SCIENCE - 2009/2010
SECOND SEMESTER (PROPER/REPEAT)
(May/June 2012)
PH 104 AC THEORY



Time: 01 hour.

Answer ALL Questions

1. An inductor with inductance L , a capacitor with capacitance C and a resistor of resistance R are connected in series across an *ac* power supply of voltage V and angular frequency ω .
 - i. Write down the complex impedance of the circuit.
 - ii. Determine the resonant frequency of the circuit.
 - iii. Determine the impedance and the current of the circuit at resonance.

A series LCR circuit has $L = 2\text{ H}$, $C = 0.5\ \mu\text{F}$ and $R = 500\ \Omega$. The circuit is connected across 100 V *ac* power supply. When the circuit is at resonance determine the following.

- i. The resonance frequency.
 - ii. The inductive, capacitive reactance and the impedance of the circuit.
 - iii. The current in the circuit.
 - iv. The potential differences across each circuit element.
 - v. The Q-factor of the circuit.
2. Define the terms true power, apparent power and power factor.

A 50 Hz alternating current supplies a coil of inductance L and resistance R . The voltage across the coil is measured as $25 V_{rms}$ and a wattmeter indicates a true power of 20 W delivered to the coil. Find values for L and R .