EASTERN UNIVERSITY, SRI LANKA

FIRST EXAMINATION IN SCIENCE - 2008/2009

SECOND SEMESTER (PROPER/REPEAT)

(October/November 2010)

PH 104 AC THEORY

Time: 01 hour.

Answer ALL Questions

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1. An inductor, a capacitor and a resistor are connected in series across an *ac* power supply of voltage V and frequency f. Draw an appropriate phasor diagram for the voltage and current through each component of the circuit. State the conditions for resonance in the circuit and find an expression for the *resonance frequency* of the circuit.

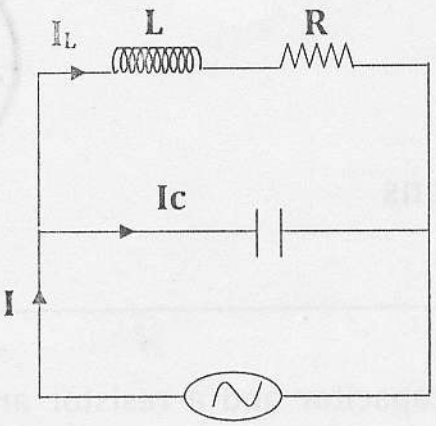
   A coil of resistance $20\ \Omega$ and inductance $0.01\ H$ is connected in series with a capacitance of $4\ \mu F$ across a $100\ V$, $1000\ Hz$ supply. Calculate:

   (i) The circuit impedance

   (ii) The circuit current

   (iii) The phase difference between supply voltage and current

2. An inductor and a resistor are connected in parallel with a capacitor as shown in the figure below. Write down the conditions for resonance in an *LCR* parallel circuit. Find an expression for the *resonance frequency* of the circuit by drawing suitable phasor diagrams.



A circuit consisting of an inductor of 0.05 H and resistance 5 Ω is in parallel with a capacitor of 0.1 μF. Calculate the frequency of resonance. At this frequency, find:

(i) The impedance

(ii) The Q-factor