



EASTERN UNIVERSITY, SRI LANKA

FIRST EXAMINATION IN SCIENCES - 2003/2004

SECOND SEMESTER

(JUNE/JULY 2005)

PH 104 AC THEORY

Time: 01 hour.

Answer ALL Questions

1. A resistor with resistance R and a capacitor with Capacitance C are connected in series across an AC voltage of frequency f .

- (i) Draw voltage-current phasor diagrams for this circuit.
- (ii) Determine the impedance and phase angle of this circuit.
- (iii) Briefly describe the functions of *low pass* and *high pass* filters

A capacitor having capacitance $C = 0.1\mu F$ and a resistor having resistance $R = 100\Omega$ are connected in series across a $50Hz, 20V$ supply. Calculate

- (i) Capacitive reactance.
- (ii) Impedance of the circuit.
- (iii) Current in the circuit.
- (iv) the voltage across the capacitor.
- (v) the phase angle.

2. A series LCR circuit has $L = 0.2H$, $C = 0.5\mu F$ and $R = 500\Omega$. The circuit is connected to $25V$ AC power supply. When the circuit is at resonance determine the following.

- (i) The resonant frequency
- (ii) The inductive reactance, 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.

If capacitor C is connected in parallel to L, R which are in series determine the complex impedance of the circuit.