Uva Wellassa University, Sri Lanka
End Semester Examination – June/July 2009
PHY 221-2 Applied Electricity (Repeat)

Time: Two (02) hours

Answer **all** questions

1.

I. What are the main advantages of using sinusoidal varying voltages for electric power applications?

II. The current in a c AC circuit at any time t seconds is given by $i = 120\sin(100\pi t + 0.36)\ A$. Find

a) The peak value, the periodic time, the frequency and phase angle relaive to $i = 120\sin(100\pi t)$.

b) The value of the current when t=0.

c) The value of the current when t= 8 ms.

d) The time when the current first reaches 60 A .

e) The time when the current is first a maximum.

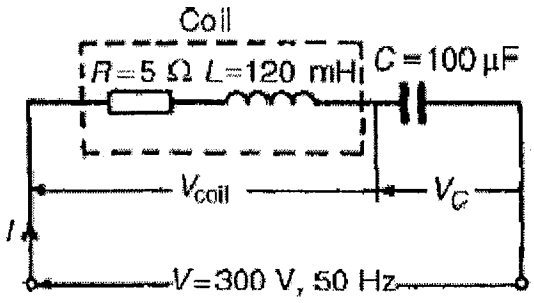
2.

I. Define impedance of an electric circuit.

II. Explain briefly how the reactance of a capacitor changes with the supplied source frequency?

III. A coil of resistance 5 Ω and inductance 120 mH in series with a 100 μF capacitor is connected to a sinusoidal voltage source having RMS value of 300V and frequency of 50 Hz.

Calculate



a) impedance of the coil
b) impedance of the capacitor
c) total impedance of the circuit
d) RMS value of the current flowing in the circuit
e) Phase difference between the supply voltage and the current
f) voltage across the coil
g) active power of the circuit.

3.

I. State Ampere's law.

II. Define magnetic flux and magnetic flux density.

III.

A coil of 300 turns is wound on a ring having relative permeability of 100. The ring has a mean circumference of 40 cm and a uniform cross section area of 4 cm^2.

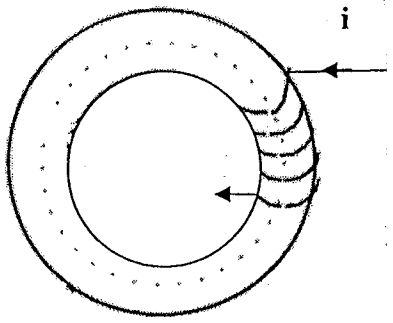
a) If the direction of the current through the coil is flowing as shown the figure 1 draw the direction of the magnetic flux .

If the current in the coil is 5A and the permeability of free space is $4\pi \times 10^{-7}$ H/m, Calculate

b) the magnetic field strength

c) flux density

d) total magnetic flux in the ring.



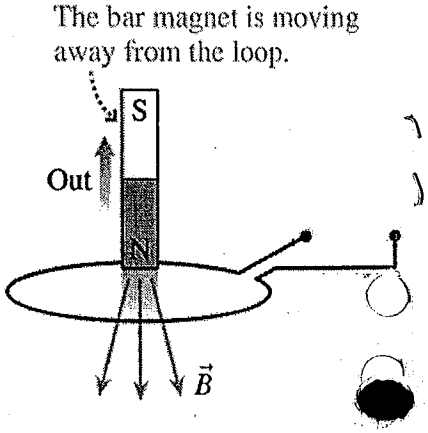
4.

I. Explain what is meant by electromagnetic induction

II. State Faraday's laws of electromagnetic induction.

III.

a) If a bar magnet is moved away from a wire loop as shown in the figure, mark the direction of induced current in the loop using Lenz law.



b) A conductor having length of 2cm moves with a velocity of 15 ms^{-1} at an angle of 90^0 to a magnetic field produced between two rectangular poles having length of 3 cm and width of 2 cm as shown in the figure. If the flux leaving a pole face is 5μWb calculate

i. Magnetic flux density between poles

ii. The magnitude of the induces e.m.f