Uva Wellassa University, Sri Lanka

Btech. Degree Programme

End Semester Examination- Semester 1

January -2009

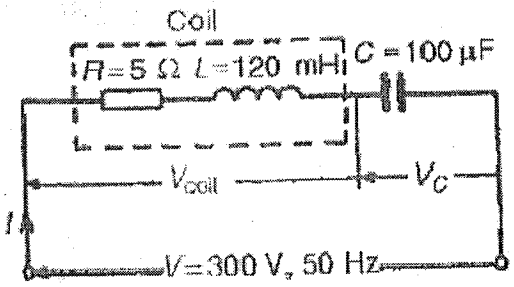
SCT 253-1 – Applied Electricity

Answer all questions

Time: One (01) hour

Question 1 (Marks 40%)

1. Define impedance of an electric circuit.
2. Explain briefly how the reactance of a capacitor changes with the supplied source frequency?
3. 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.

Question 2 (Marks 30%)

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.

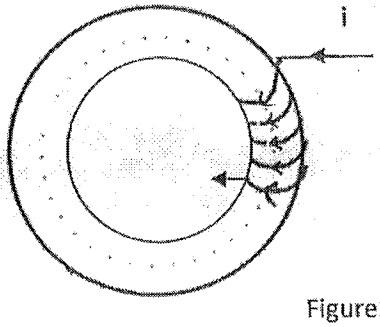
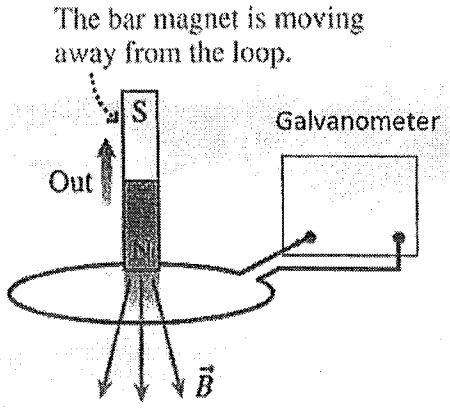


Figure1

Question 3 (Marks 30%)

1. 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.



2. 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
   a) Magnetic flux density between poles
   b) The magnitude of the induces e.m.f