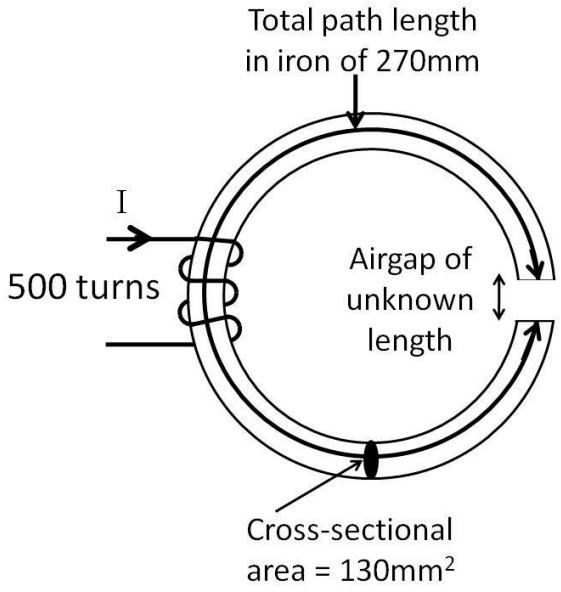
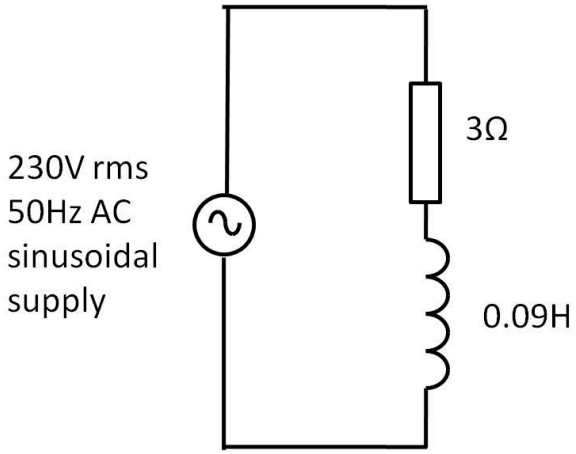
B

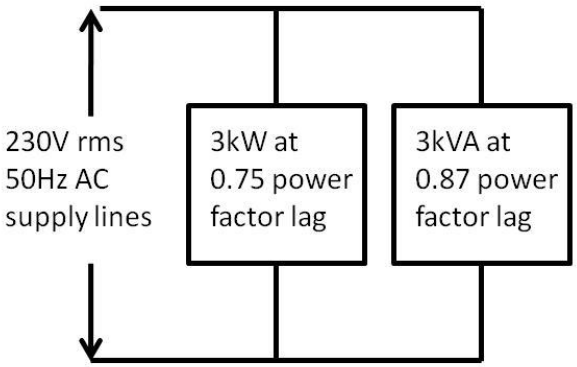
Registration number:

EEE102 Power Networks
Mid Term Test – March 2010

Constants required: $\mu_0 = 4\pi x10^{-7}$ Hm^{-1}

	Question	Answer	Marks
1	i) Convert the impedance 3 + j9 Ω into a magnitude and phase representation: ii) Convert the impedance 0.3 ∠75° Ω into a cartesian complex representation	i)	[1]
		ii)	[1]
2	A 500 turn coil is wound onto the circular iron core shown below. The iron core has a fixed relative permeability of 800 and includes a small airgap as shown. The total length of the flux path within the iron core is 270mm. When a current of 4.5A flows in the coil, the flux density in the core is 1.2T. Calculate the length of the airgap which results in these conditions and hence calculate the inductance of the coil  	Include any intermediate calculations in this box and state answer at bottom of box Airgap length: Inductance:	[6] [2]

3	Calculate the impedance of the circuit below; the magnitude and phase of the current drawn from the supply; the VA, VAr, and the real power supplied to the load; and finally the peak energy stored in the inductor  	Impedance:	[1]
		Current:	[1]
		VA:	[1]
		VAr:	[1]
		Real power:	[1]
		Peak energy stored in the inductor:	[1]

4	Calculate the total Watts, VA and VAr drawn by the combination of loads shown below and hence calculate the current drawn from the supply  	Show all your intermediate calculations in the box and state the final answers at the bottom of the box Watts: VA: VAr: Current drawn from supply:	[5]

END OF QUESTION PAPER