

**College of Engineering, Pune**  
**End Semester Exam – November 2011**  
**F. Y. B. Tech. (Non Electrical Branches)**  
**(EE101)- (Basic Electrical Engineering)**

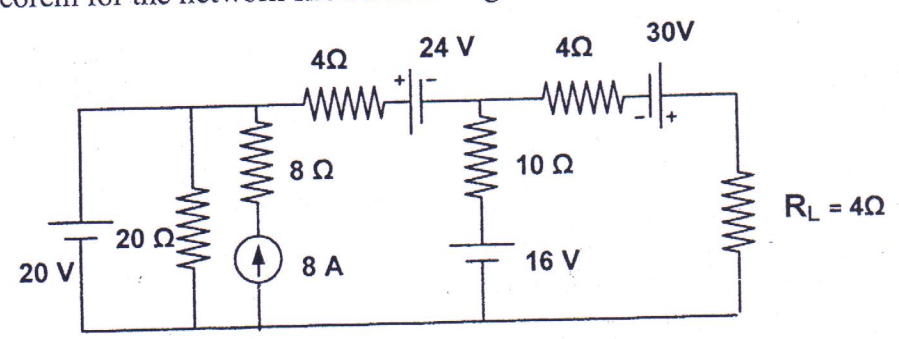
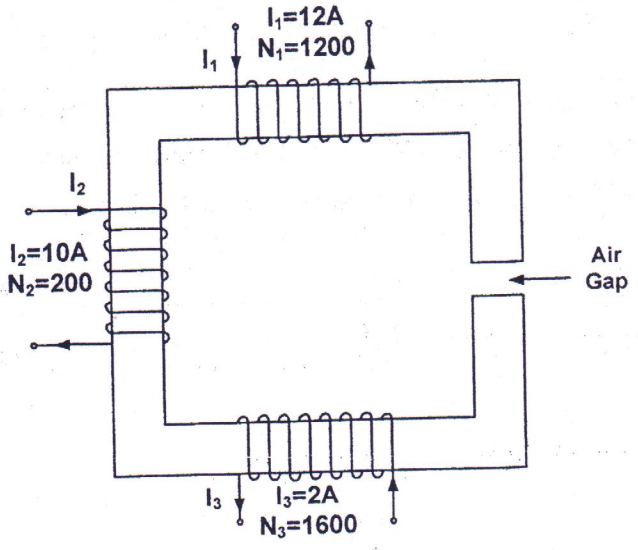
Day & Date- Saturday 26<sup>th</sup> November 2011  
 Maximum Marks: 50

Time: - 10 am to 1pm  
 Duration – 3 hrs.

**Instructions:**

1. All questions are compulsory.
2. Non programmable calculators are allowed.
3. Figures to the right indicate full marks.
4. Assume suitable data wherever necessary.

			Marks
<b>Q.1</b>	A.	Two elements are connected in series across an ac source, $v = 200\sqrt{2} \sin(314t + 20^\circ)V$ . The current in the circuit is found to be $i = 10\sqrt{2} \cos(314t - 25^\circ)A$ . Determine the parameters of the circuit.	4
	B.	Compare single phase AC system with 3-phase AC system (Any Two points).	2
	C.	Two resistors, made of different materials having temperature coefficients of resistance $\alpha_{01} = 0.004/^\circ C$ (r.t.c of first resistor at $0^\circ C$ ) and $\alpha_{02} = 0.005/^\circ C$ (r.t.c of second resistor at $0^\circ C$ ), are connected in parallel and consume equal power at $15^\circ C$ . What is the ratio of power consumed in resistance $R_2$ to $R_1$ at $70^\circ C$ .	4
<b>Q.2</b>	A.	Determine the equivalent resistance between the terminals X and Y of the network shown in Fig. 1 below: <div style="text-align: center; margin-top: 10px;"> </div>	5

	<p><b>B.</b> Find the current through the load resistance <math>R_L = 4 \text{ ohm}</math> by Thevenin's theorem for the network shown in the fig.2 below.</p>  <p style="text-align: center;"><b>Fig.2</b></p>	<b>5</b>
<p><b>Q.3</b></p>	<p><b>A.</b> A magnetic circuit is excited by three coils as shown in Fig.3. Calculate the flux produced in the air gap. Material used for the core is iron having relative permeability of 600. Length of magnetic circuit is 150 cm with an air gap of 2 mm in it. Core has uniform cross section diameter of 6cm.</p>  <p style="text-align: center;"><b>Fig.3.</b></p>	<b>4</b>
	<p><b>B.</b> An inductor has a core built up of stampings of the shape shown in fig.4. , the coil being on the central limb which has a cross section area of <math>4\text{cm}^2</math> . All other paths in the core have a cross sectional area of <math>2\text{cm}^2</math> . The mean path lengths of the magnetic flux in each portion of the core are shown in the fig.4. If relative permeability is 800, find the current needed in coil of 500 turns to produce total flux in air-gap of <math>0.8\text{mWb}</math>.</p>	<b>6</b>

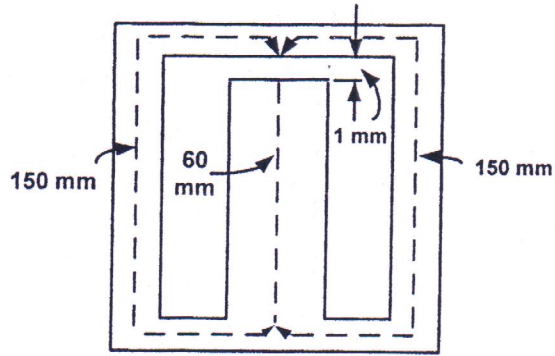


Fig4

Q. 4	A.	Distinguish between ideal and practical transformer.(any 3points)	3
	B.	State with reasons the choice of electrical machine for the following application: i) Centrifugal pump. ii) Electric traction. iii) Ceiling fan.	3
	C.	A transformer is rated at 100kVA. At full load its copper loss is 1200W and its iron loss is 960W. Calculate:- (i) The efficiency at full load, unity power factor, (ii) The efficiency at half load, 0.8 power factor lagging, (iii) The load kVA at which maximum efficiency will occur.	4
Q. 5	A.	Explain the working of fluorescent tube with a neat circuit diagram.	3
	B.	Compare fuse with MCB as current interrupting device.	2
	C.	State any four methods of electric heating along with one application of each.	2
	D.	In a residential house, the following loads are connected: 1) Six lamps of 60W each, switched for 8 hours a day. 2) Four fans of 60W each, switched for 12 hours a day. 3) One 1000W heater working for 2 hours per day. 4) One refrigerator of 250W, working for 12 hours per day. If each unit of energy costs Rs. 4.50, what will be the total cost of energy in the month of October?	3
		***** <i>BEST OF LUCK</i> *****	