Time: 3 Hours

Dated: 12-11-2008

ELECTRICAL TECHNOLOGY FUNDAMENTALS
(EE-115)

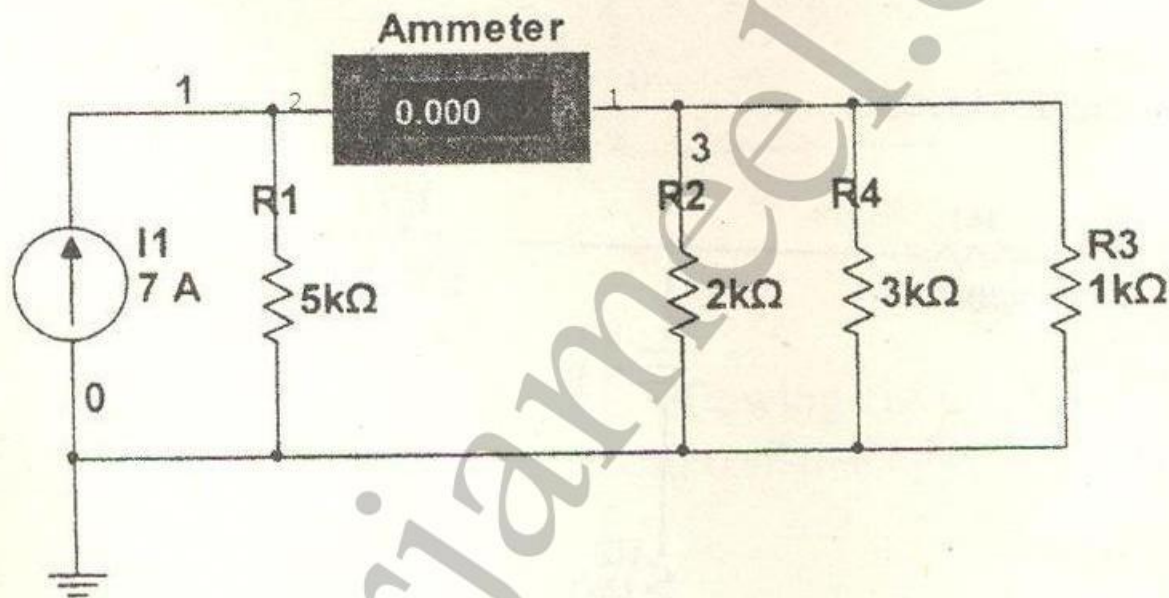Max. Marks: 75(For regulars)/80(Repeaters)

Instructions:

1) Attempt any FIVE questions, all questions carry equal marks.

2) Draw sketches, where necessary.
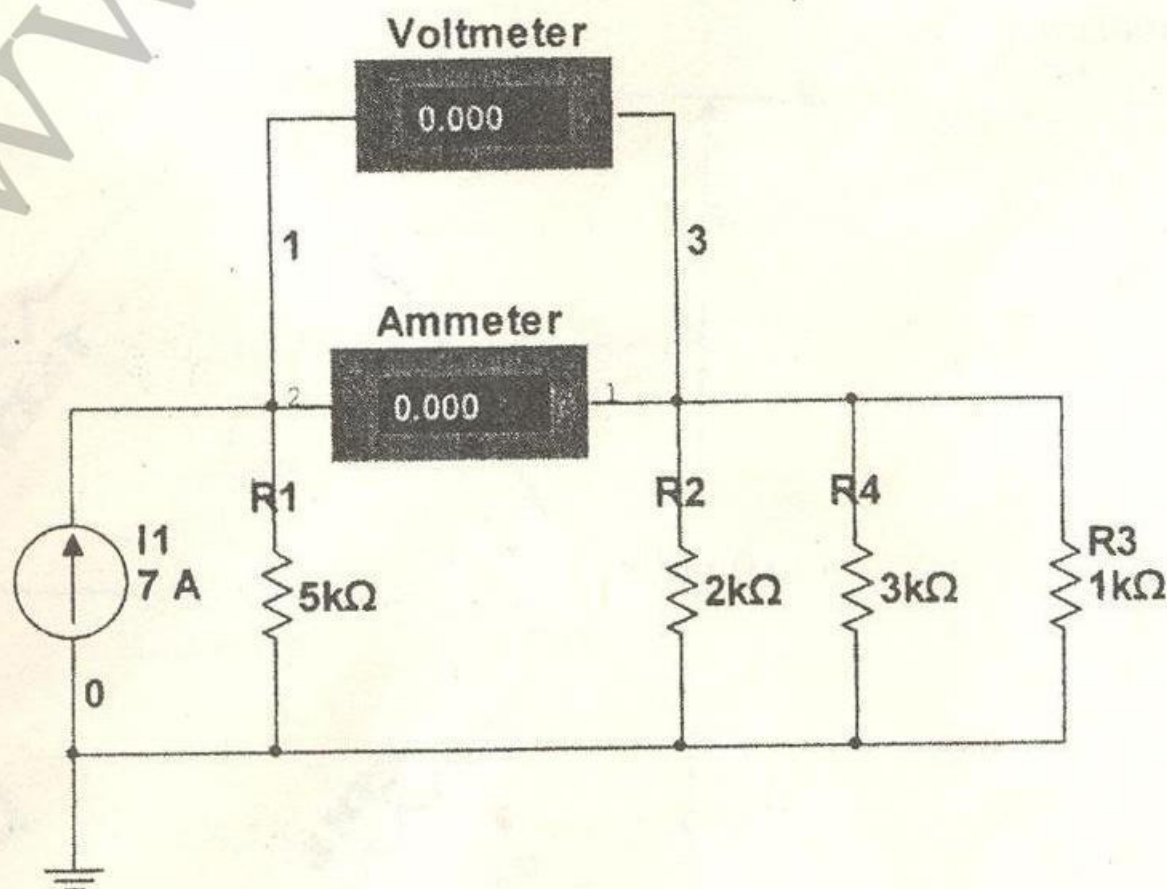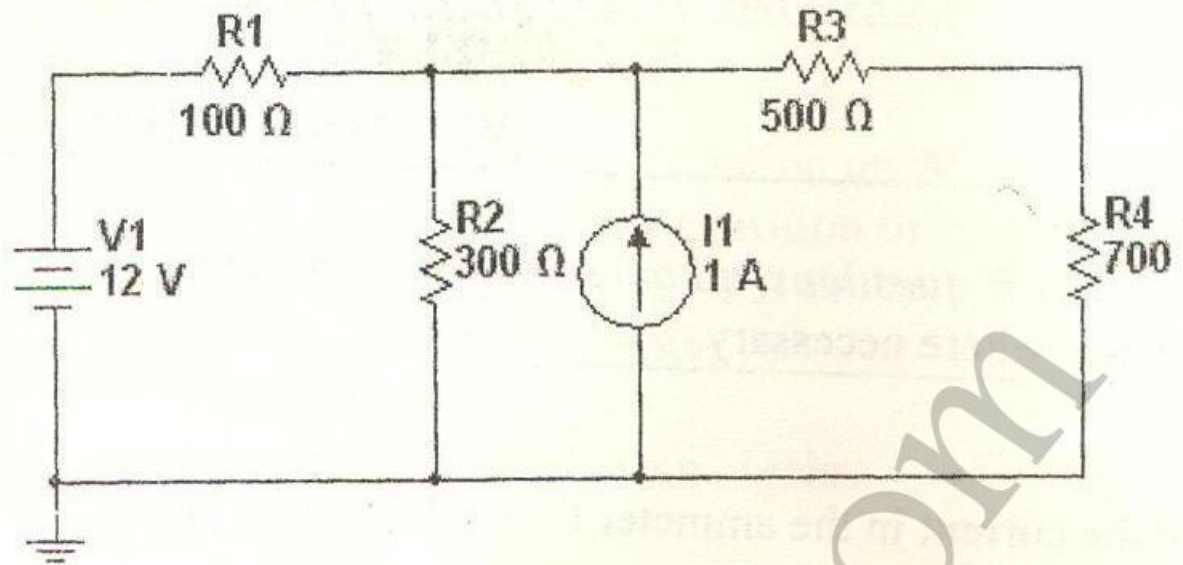
Q. No. 01   (4+3+8)/(4+3+9)

a) Determine the current in the ammeter for the following circuit. *Use current division rule*

b) Determine the Voltage measured by the voltmeter.
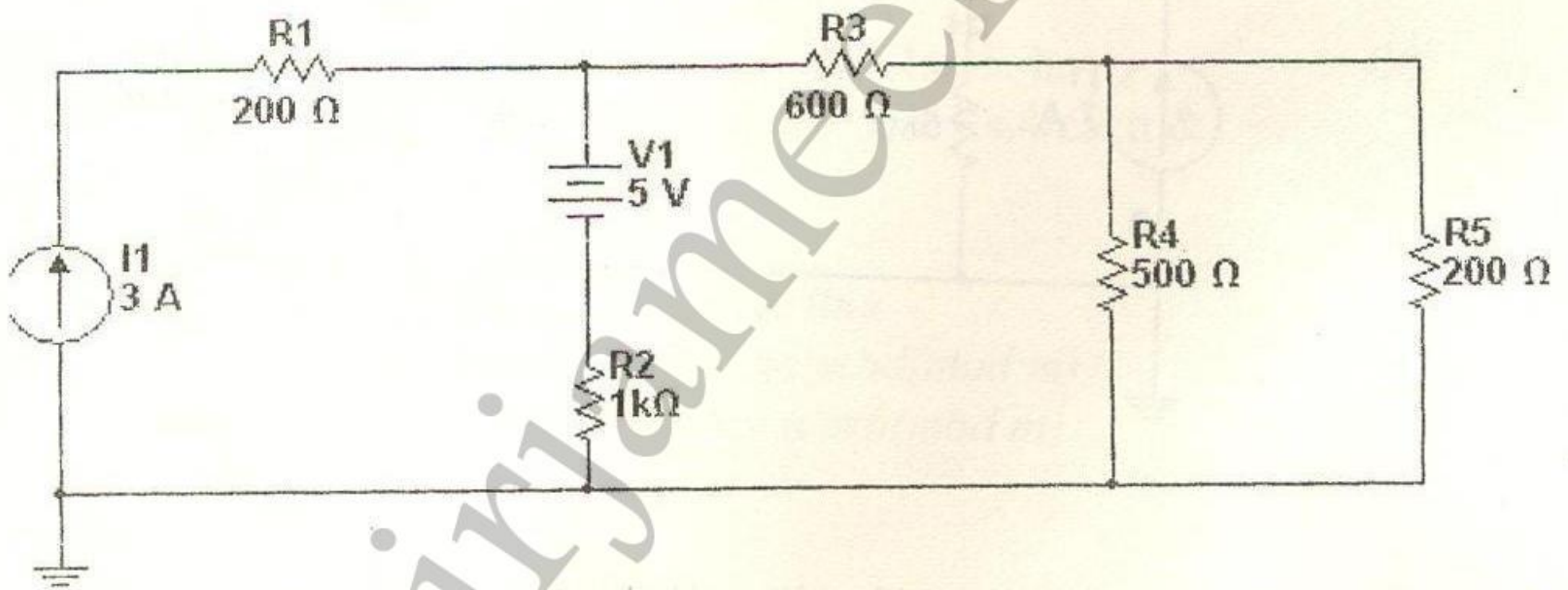
c) Determine all node voltages
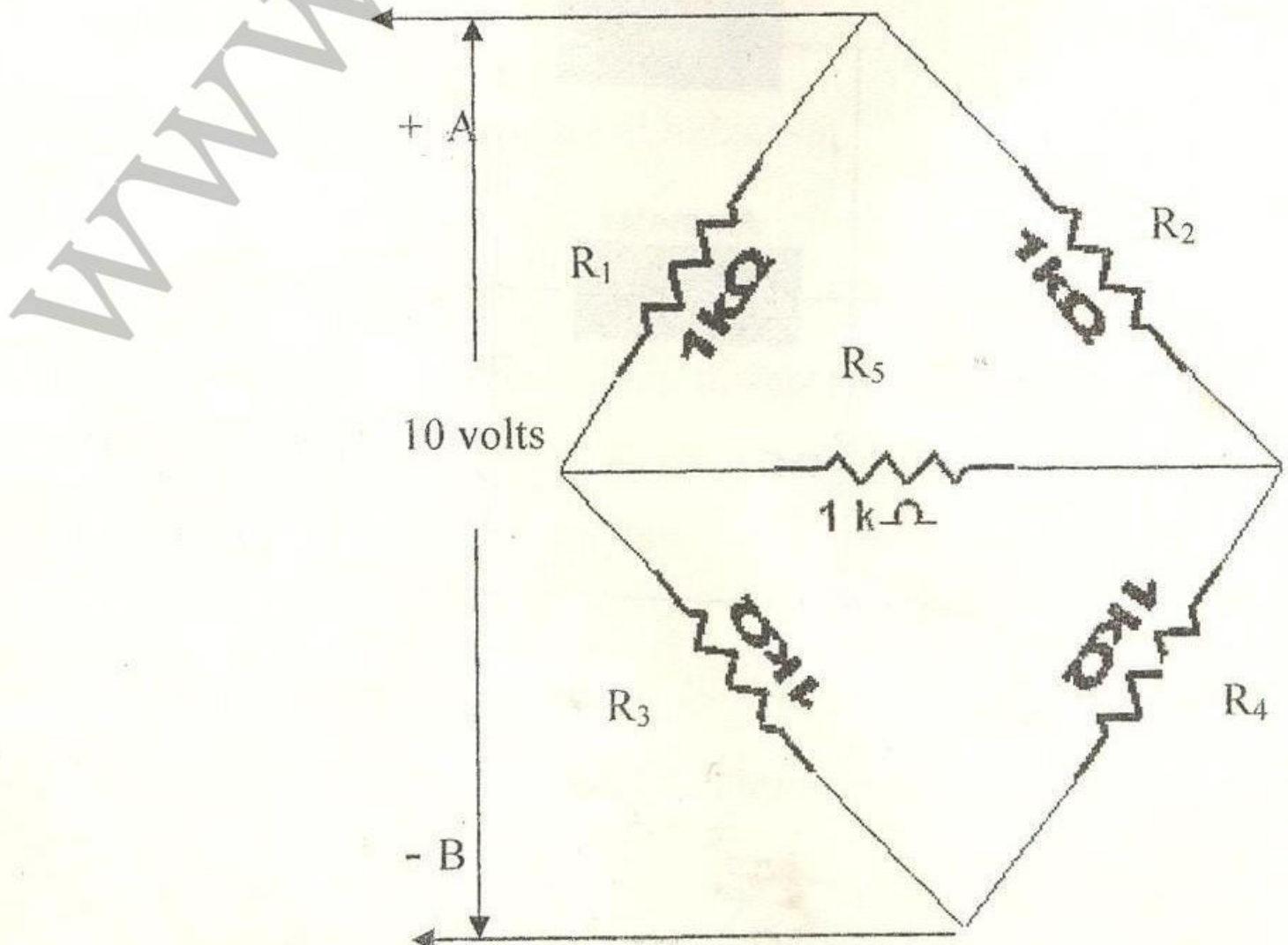

Q. No. 02   (7+8)/(8+8)
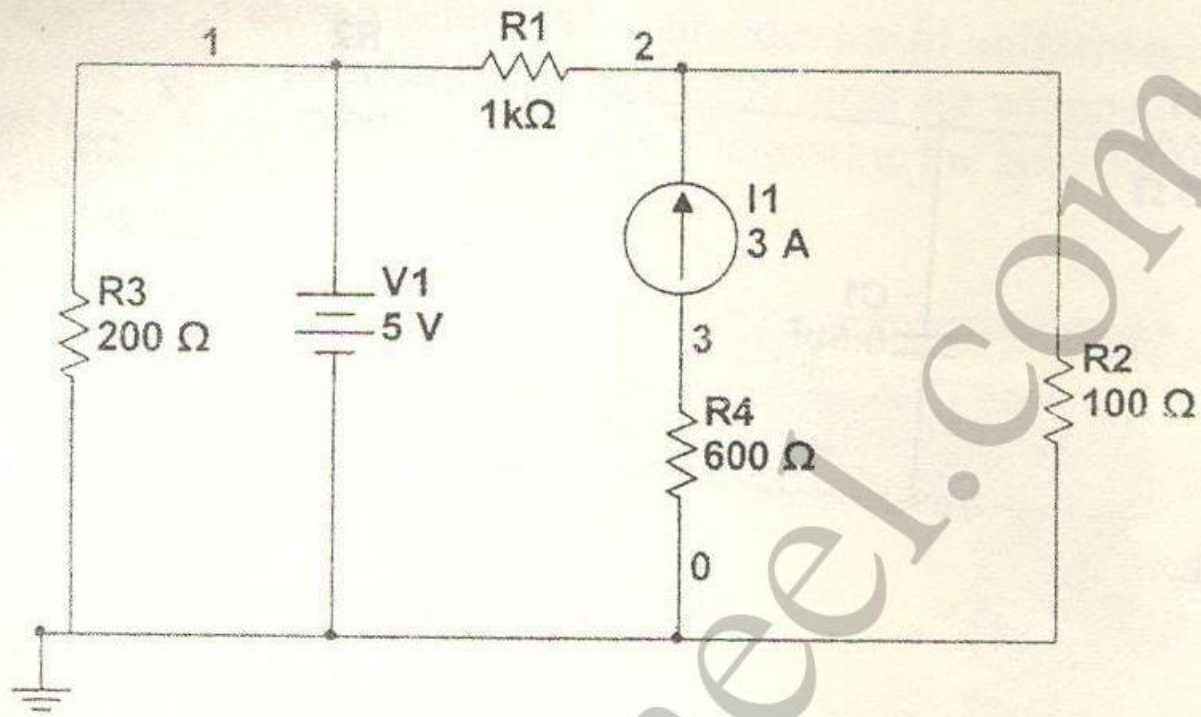a) Determine the mesh currents

b) Determine current in every resistor, if the voltage across A and B is 10 volts (*Hint:*
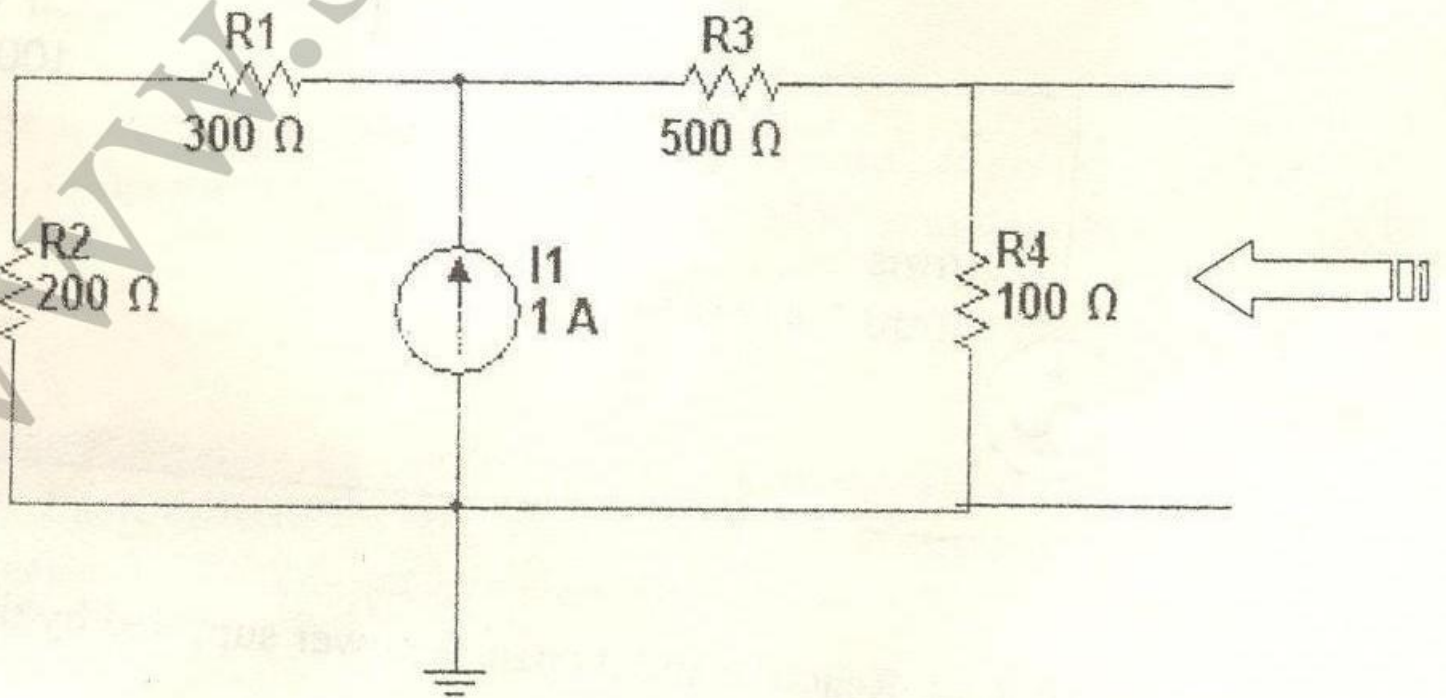*Use nodal analysis*)

2-5

Q. No. 03 $(7+8)/(8+8)$

a) Determine voltage across R_2, *using Superposition Theorem*
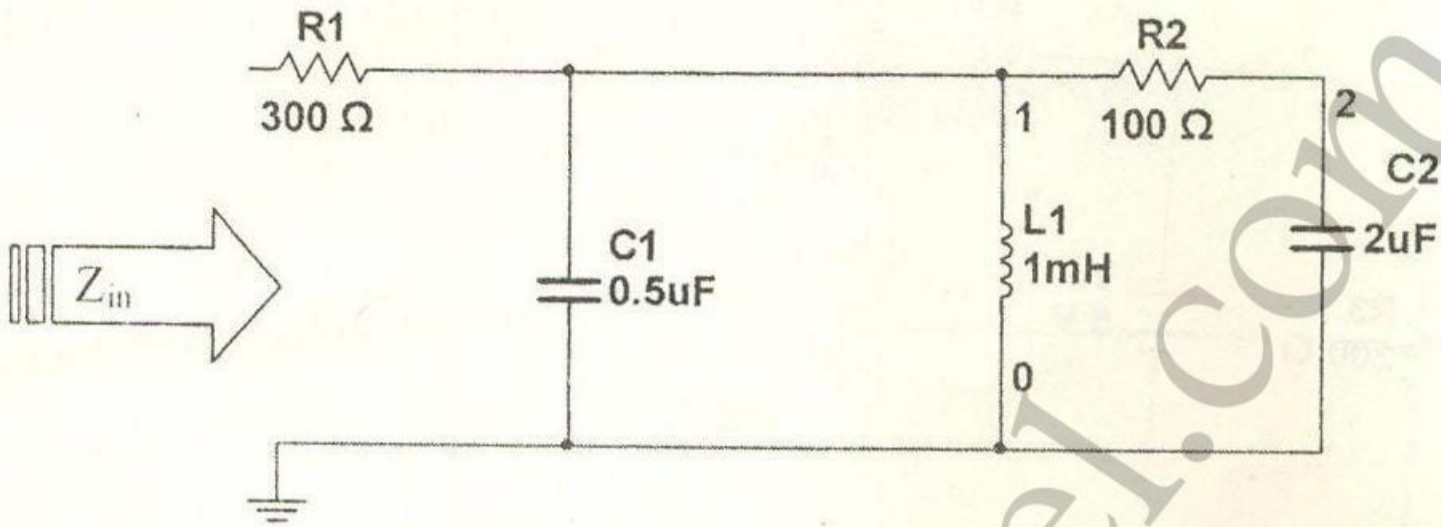

b) Determine the *Thevenin equivalent* circuit of the following circuit. View the circuit in the direction of arrow. Also suggest the value of Load resistance for maximum power output.

Q. No. 04 (7+8)/(8+8)

a) Define impedance. Determine the impedance of the circuit shown below for $\omega = 300$ rad/sec.
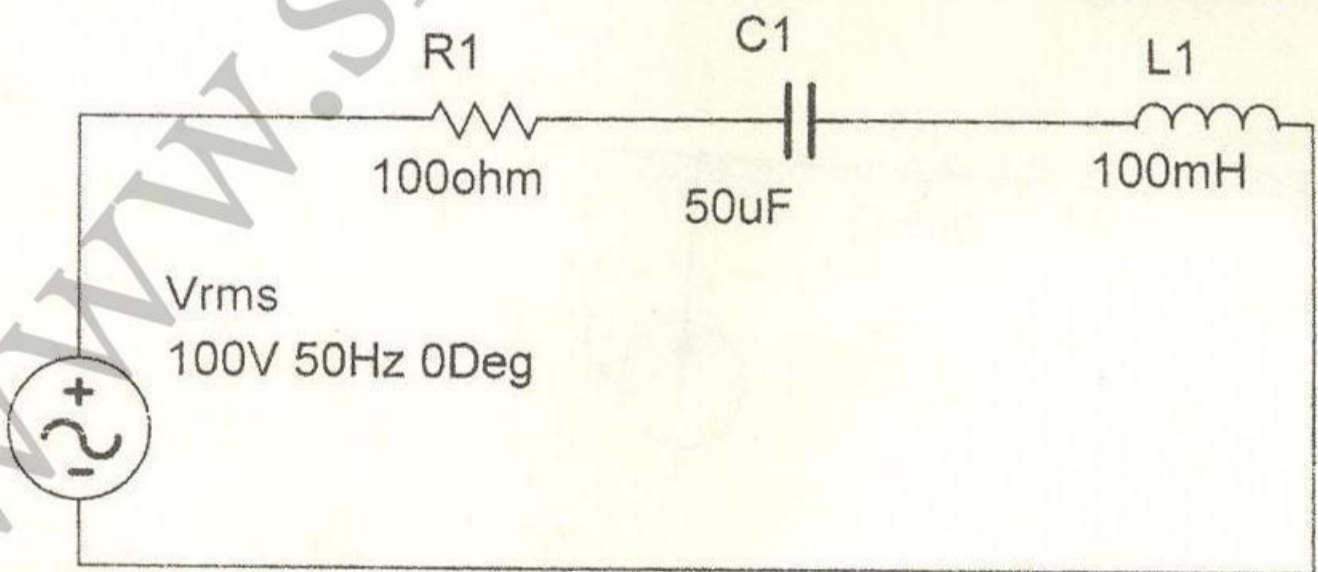

b) Drive the voltage and current relations for inductor, capacitor and resistor connected to an A.C voltage source. Also discuss the significance of Phasors.
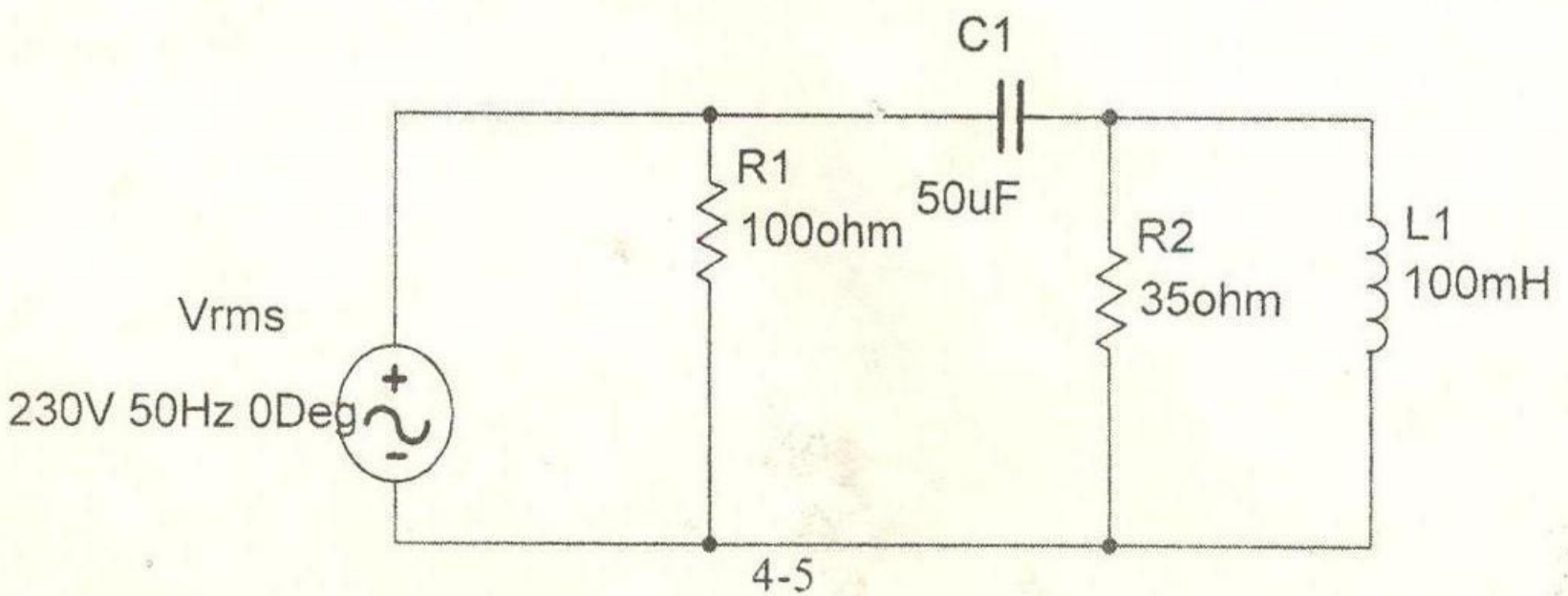
Q. No. 05 (8+7)/(8+8)

a) Find out the current in the series RLC circuit. Also determine the source power factor.

b) Compute the Real, Reactive and Apparent power supplied by the voltage source.


4-5

Q. No. 06   (6+9)/(7+9)

a) Drive the expression for the flux in a ferromagnetic core. You may assume the required conditions and data.

$$\phi = (N \times I)R$$

b) A ferromagnetic core is shown below. All four sides are of uniform width and depth. The relative permeability of the material is 6000. 200 turns are wrapped on one of the sides of the core. If the current I is equals to $6A$. Determine the amount of flux produced in the core.
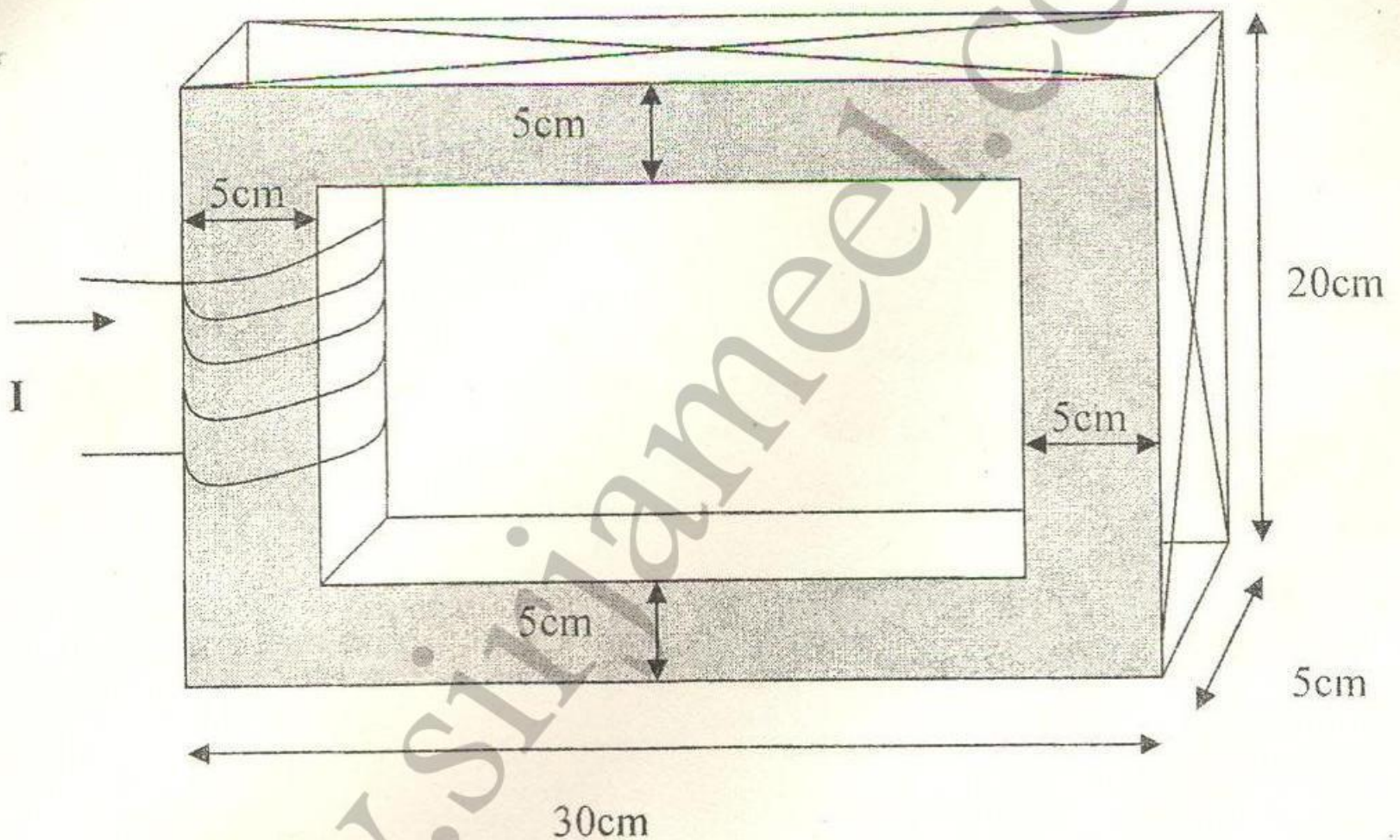
Q. No. 07   (9+6)/(9+7)

a) Explain the working principle of an Ideal Transformer at no load and loaded conditions. Drive the following relation for an ideal transformer

$$\frac{Vp}{Vs} = \frac{Np}{Ns} = \frac{Is}{Ip}$$

b) The secondary winding of transformer has a terminal voltage of 280 volts (r.m.s). The turns ratio of the transformer is 60:20. If the secondary current of the transformer is 7.07A (r.m.s) what is the primary voltage and current of the transformer?

Q. No. 08   (15)/(16)

Write short notes on any two of the following

1. Type of Core Losses.
2. Weber Theory.
3. Digital VS analog Instruments.

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