



Reg. No. :

Name :

**Combined First and Second Semester B.Tech. Degree
Examination, March 2018
(2013 Scheme)
13.108 : FUNDAMENTALS OF ELECTRICAL ENGINEERING (E)**

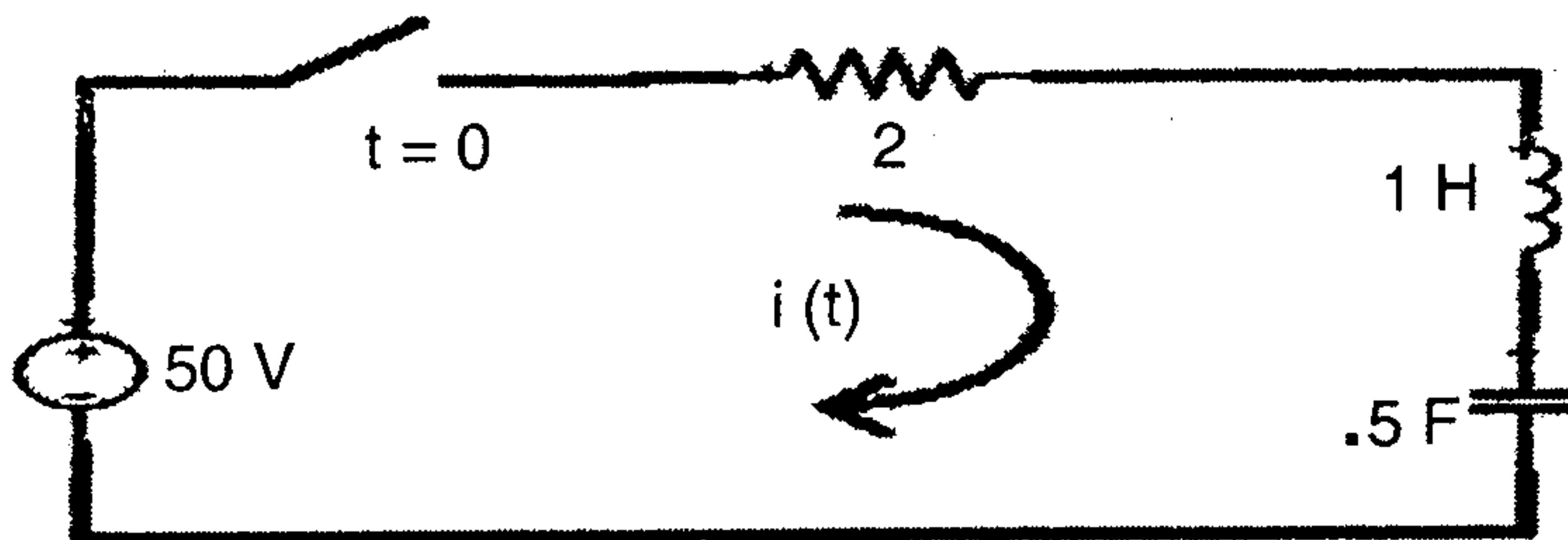
Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **2** marks.

1. Discuss about the time invariant and time variant elements.
2. Distinguish between voltage controlled voltage source and current controlled voltage source.
3. Define Millmann's theorem.
4. Compare magnetic circuit with electric circuit.
5. Derive the average value of sinusoidal current.
6. An inductive coil having negligible resistance and 0.1 henry inductance is connected across 200 V, 50 Hz supply. Find inductive reactance and rms value of current.
7. Enumerate the advantages of 3 phase over single phase system.
8. Consider the circuit shown, there is no initial charge on the capacitor. If the switch s is closed at $t = 0$, determine the resulting current.



9. Sketch the variation of impedance and admittance in parallel resonant circuits.
10. What is the necessity of earthing ? (10×2=20 Marks)

P.T.O.

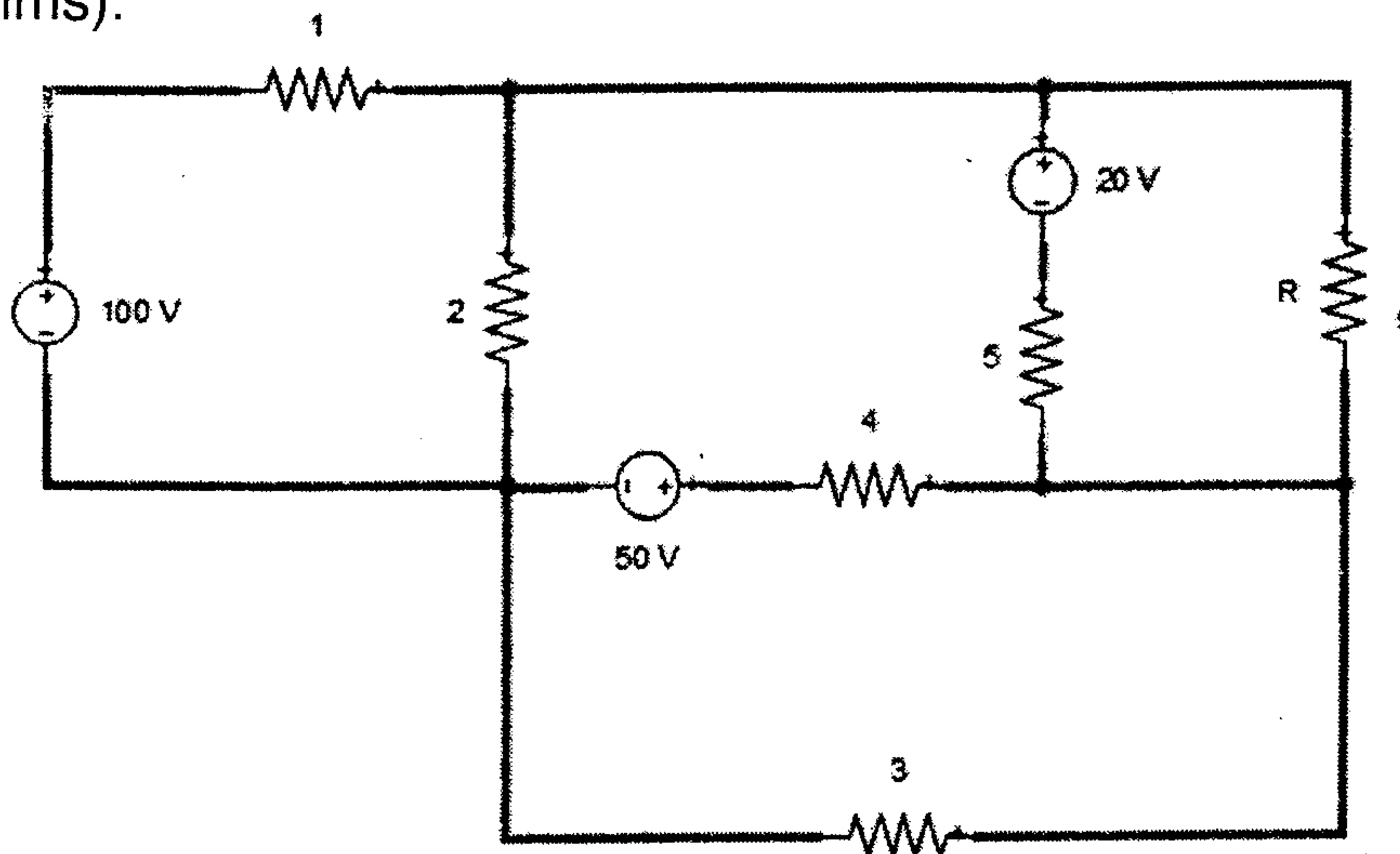


PART – B

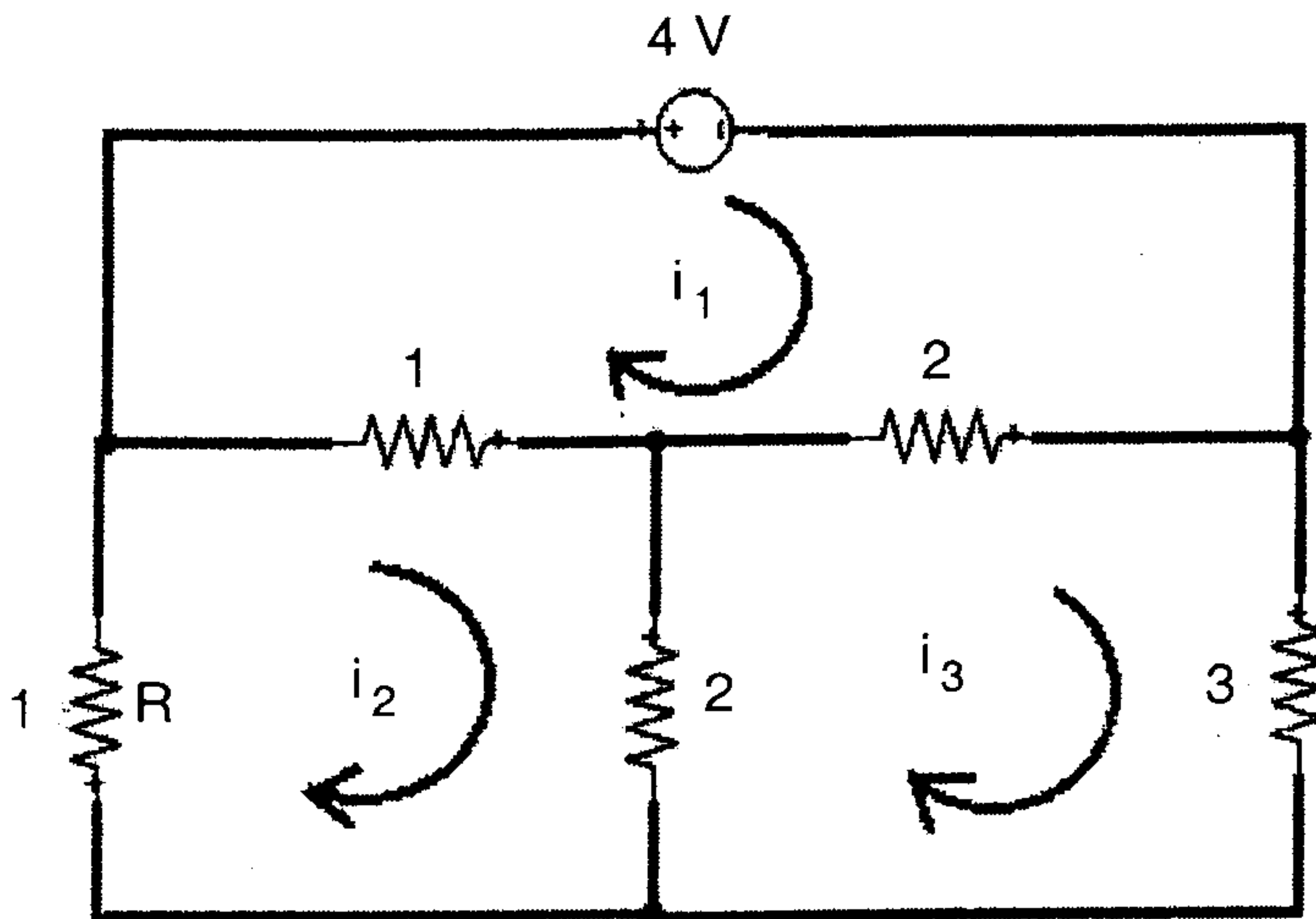
Answer **any one full** question from **each** Module. **Each** question carries **20** marks.

Module – I

11. a) Find the current through 4 ohm resistor using nodal analysis. (All resistances in Ohms). 10



- b) Find the mesh currents. All resistances in Ohms. 10



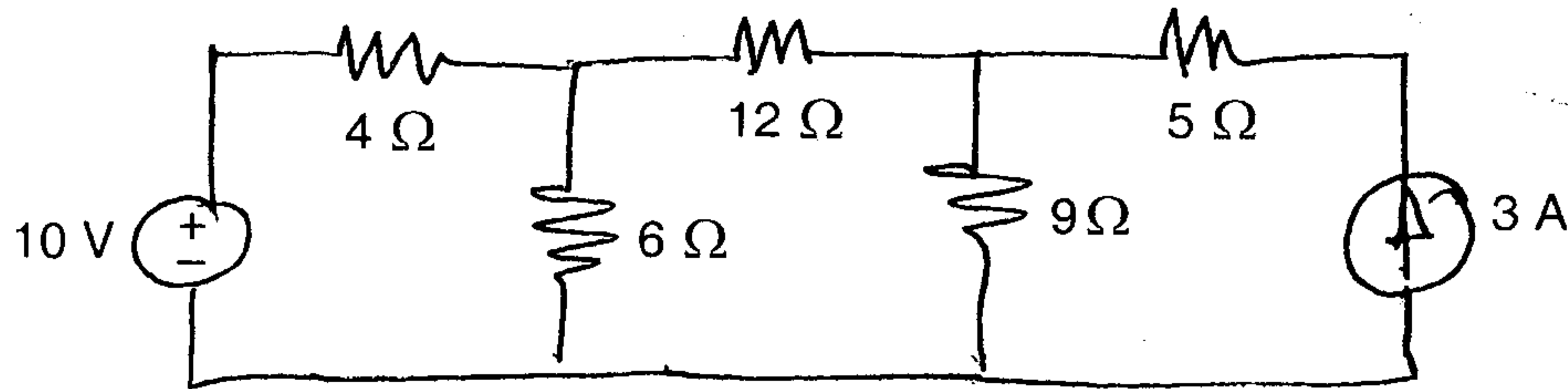
OR

12. a) The self inductance of a coil of 500 turns is 0.25 H. If 60% of the flux is linked with a second coil of 10000 turns (i) the mutual inductance of two coils (ii) emf induced in the second coil when current in the first coil changes at the rate of 100 A/s. 5
- b) Two inductance each of 10 H and 20 H are connected in parallel. If the current in 10 H changes at uniform rate from 1 to 5 amperes in one second. What is the effect on the 20 H inductance ? 5



c) Find the voltage drop across 9Ω resistor.

10



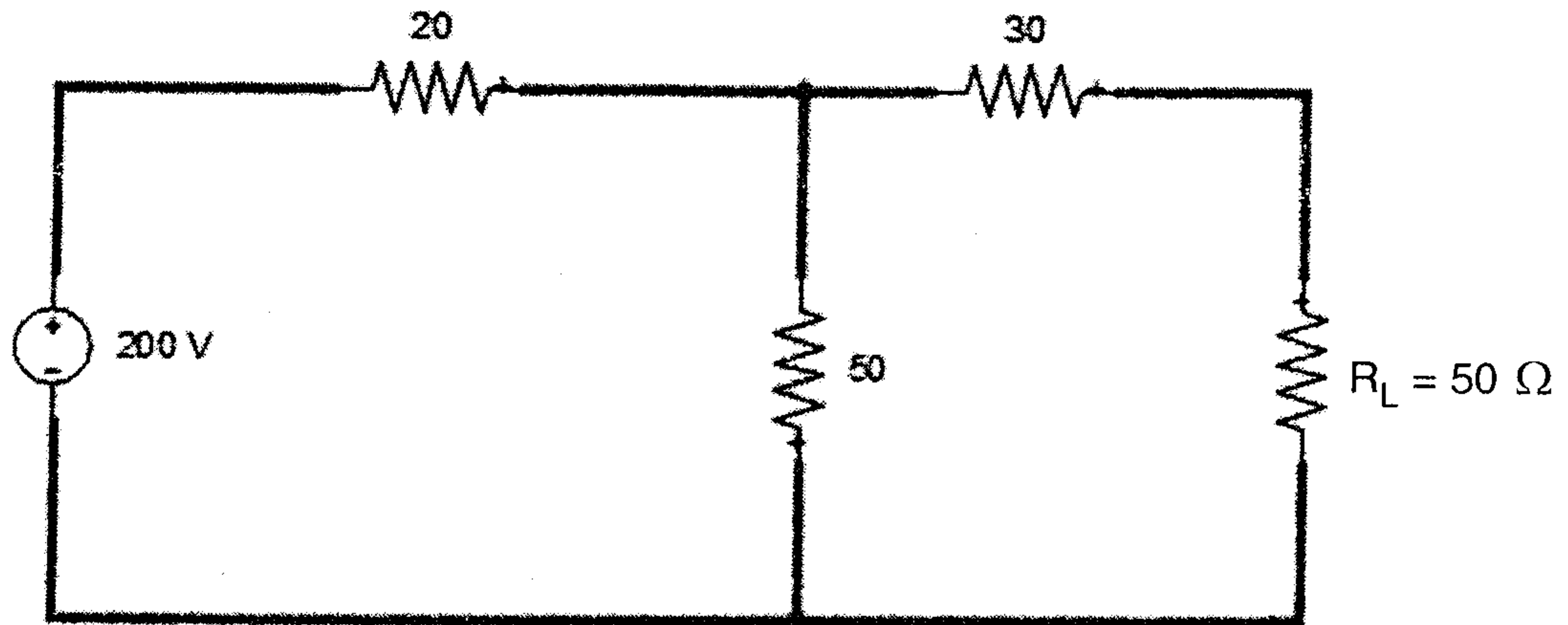
Module - II

13. a) A steel ring 10 cm mean radius and of circular cross section 1 cm in radius has an air gap of 1 mm length. It is wound uniformly with 500 turns of wire carrying current of 3 A. Neglect magnetic leakage. The air gap takes 60% of the total mmf. Find the total reluctance.

12

b) For the circuit is shown in figure. Find the value of current in $R_L = 50 \Omega$.

8



OR

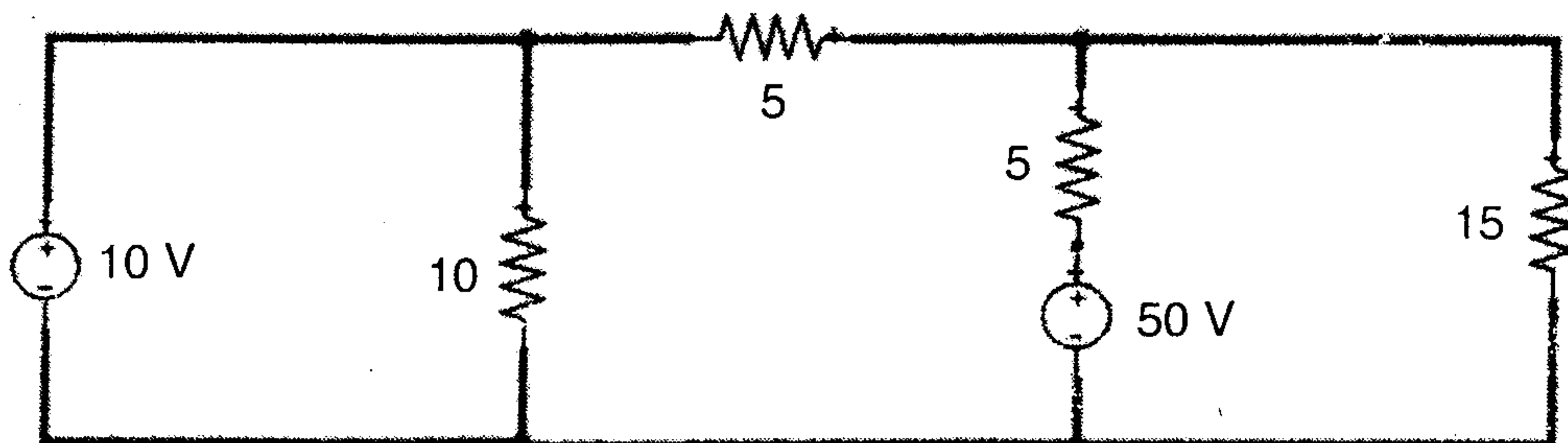
14. a) For a half wave rectified alternating current find

- i) average value
- ii) rms value
- iii) form factor and peak factor.

8

b) Draw the Norton's equivalent circuit and determine the current flowing through 15Ω resistor for the figure shown below (All resistances in Ohms).

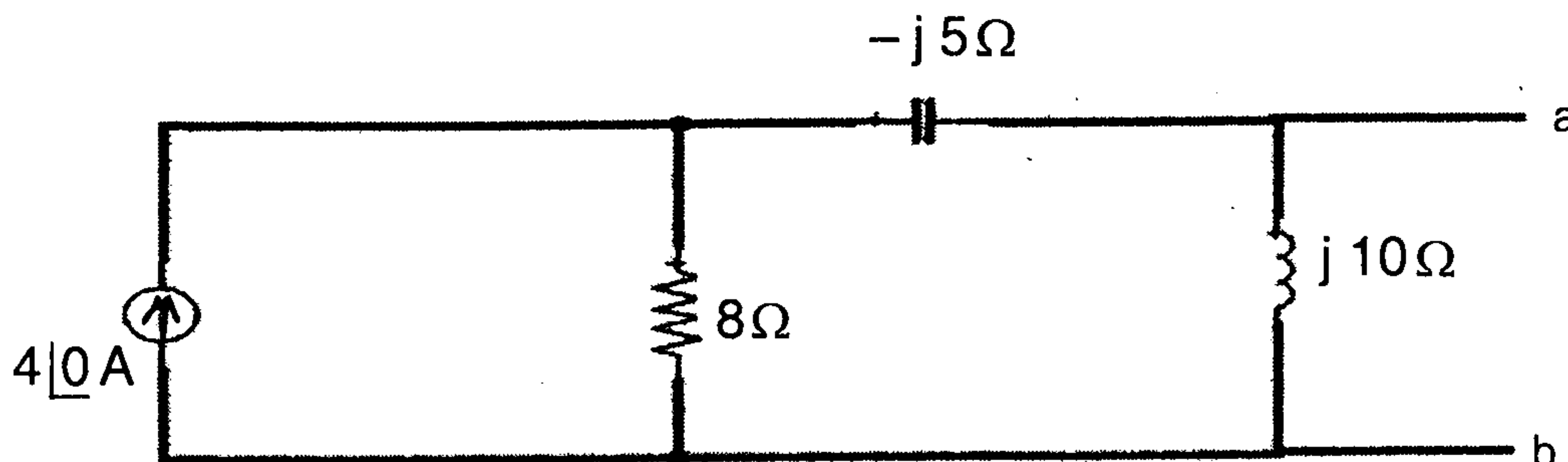
12





Module – III

- 15. a) Explain the maximum power transfer theorem and prove with an example. 10
- b) Find the Thevenin's equivalent circuit at the terminals a – b for the circuit shown below. 10



OR

- 16. a) Non inductive loads of 8 KW, 6 KW and 4 KW are connected between neutral and red, yellow, blue phase respectively of a 3 phase, 4 wire system. The line voltage is 400 V. Find the current in each line conductor and neutral. 10
- b) Draw the phasor diagrams of series RL, RC and RLC circuits and explain. 10

Module – IV

- 17. a) Explain in detail about pipe earthing. 10
- b) In a series resonant circuit, the current is maximum when $C = 500 \text{ pf}$ and the frequency is 1 MHz. If C is changed to 600 pf, the current decreases by 50%. Find the resistance, inductance and quality factor. 10

OR

- 18. a) Analyse the step response of RL circuit through Laplace transform. 10
- b) Find the value of $V_c(t)$ for $t > 0$ in the circuit shown below. Assume initial condition $V_c(0^-) = 9 \text{ V}$. 10

