

(REVISED COURSE)

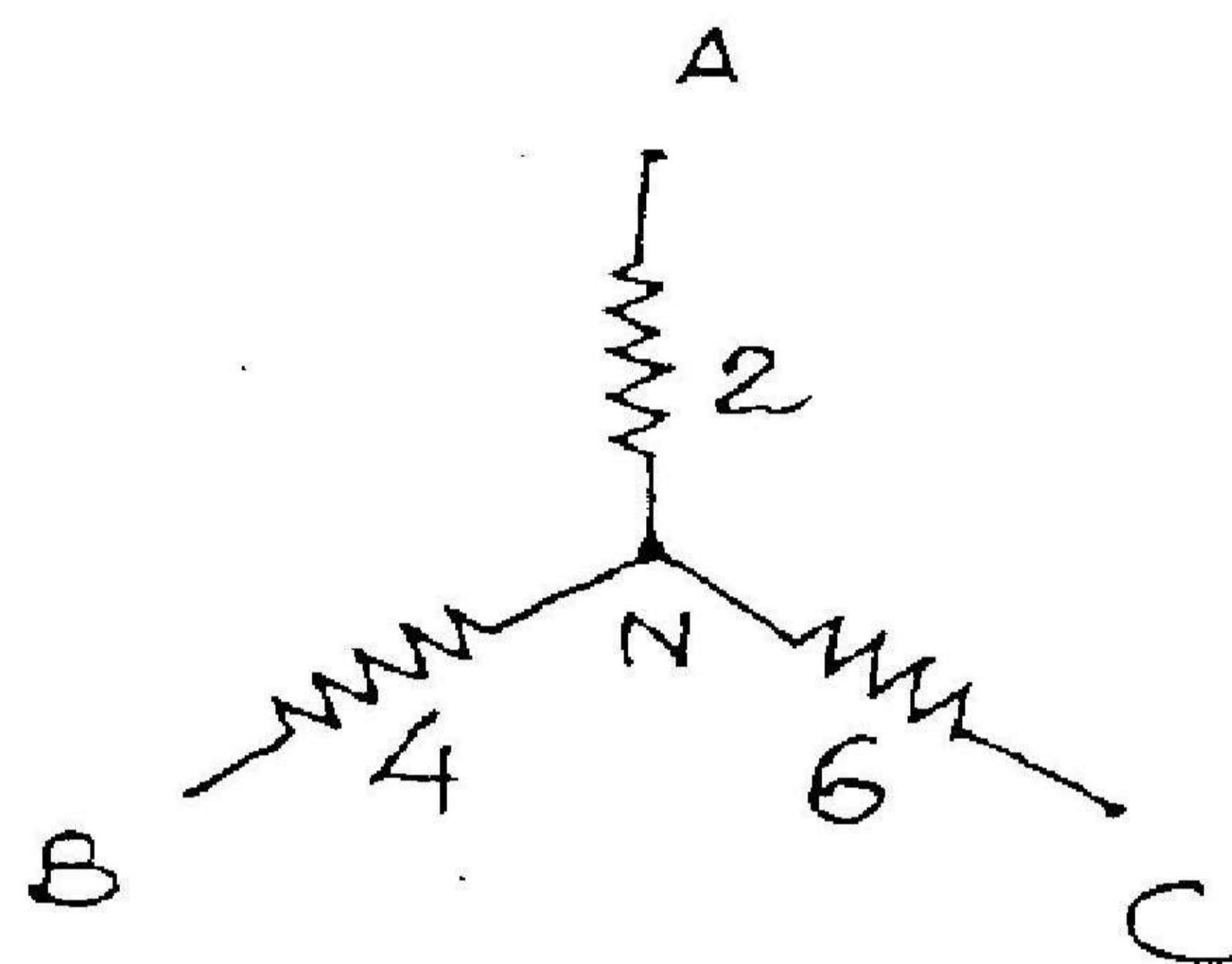
QP Code : 1015

(3 Hours)

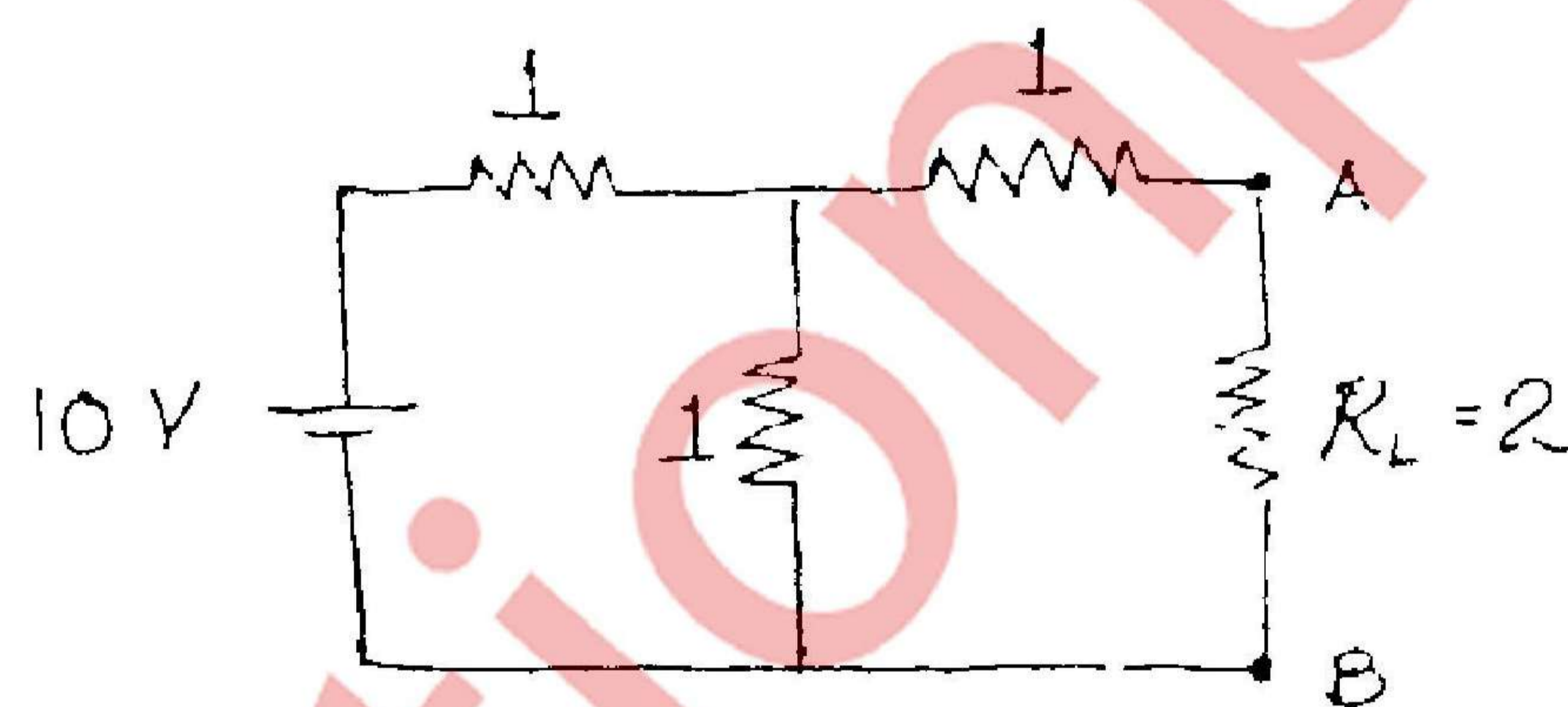
[ Total Marks : 80

- N.B. : (1) Question no. 1 is compulsory.  
(2) Attempt any **three** questions from the remaining **five**.  
(3) **Figures** to the **right** indicate **full** marks.  
(4) Wherever **not** mentioned **values** of resistance is in **ohms**.  
(5) **Assume** suitable **data** if **necessary**.

1. (a) Convert the star circuit into its equivalent delta circuit. 3

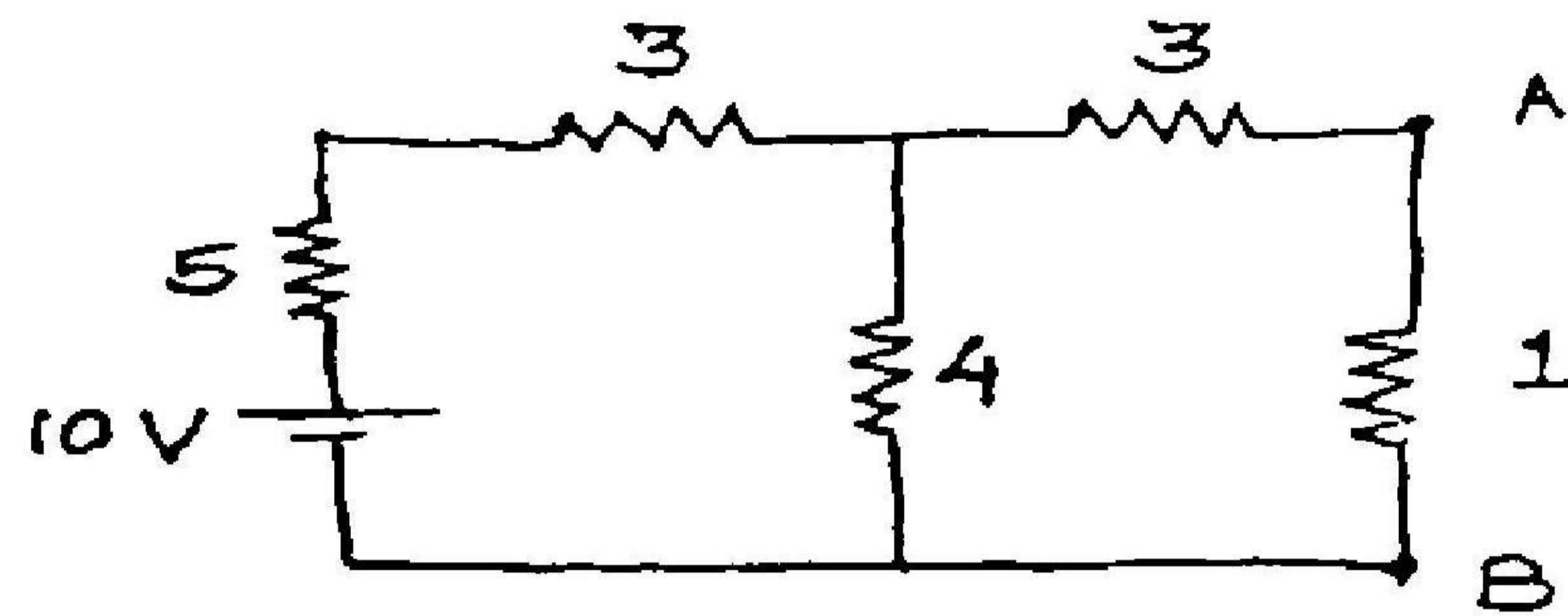


(b) For the given circuit find the Norton equivalent between points A and B. 3

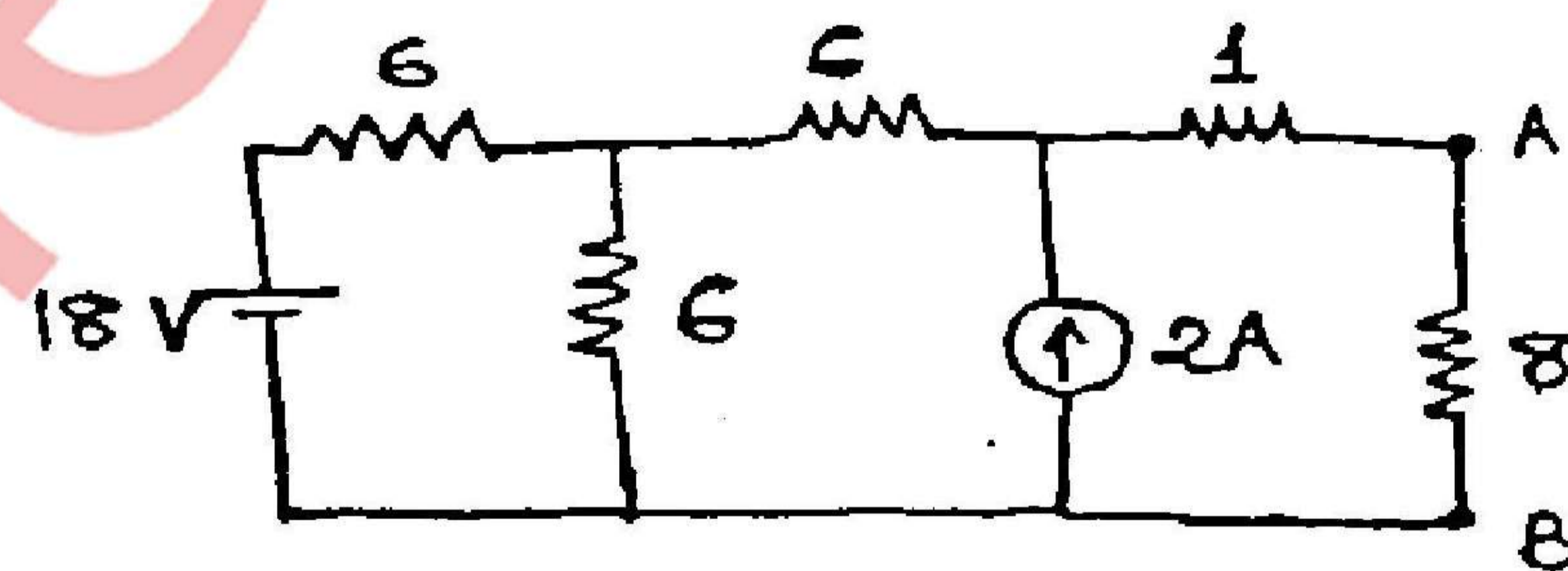


- (c) Draw an a.c. waveform, indicate there on and explain (i) instantaneous value, (ii) peak value and (iii) time period for one cycle of the alternating quantity. 3
- (d) Differentiate between series and parallel resonance with respect to 3
- (i) Impedance at resonance
  - (ii) Current at resonance
  - (iii) Magnification factor
- (e) Draw the phasor diagram for 3 phase delta connected load with a lagging power factor. Indicate line and phase voltage and currents. 2
- (f) Derive the emf equation for a single phase transformer. 4
- (g) Draw a neat circuit diagram for a full wave bridge rectifier using 4 diodes and the corresponding input and output waveforms for voltage. 2

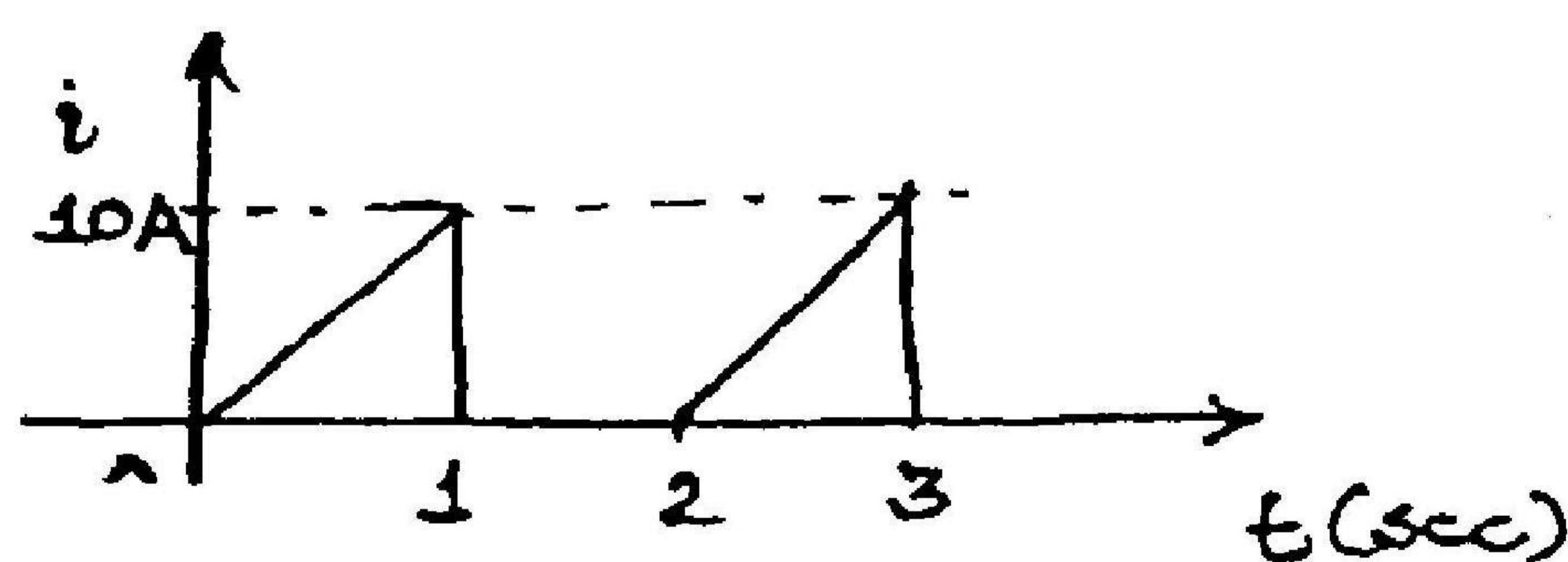
2. (a) Find the current through  $1\Omega$  resistance using Mesh Analysis. 6



- (b) A coil having a resistance of  $10\Omega$  and an inductance of  $40\text{ mH}$  is connected to a  $200\text{V}$ ,  $50\text{ Hz}$  supply. Calculate the impedance of the coil, current, power factor and power consumed. 8
- (c) Draw the phasor diagram of a transformer on no load and explain the various currents and voltages in it. 6
3. (a) Three similar coils each having a resistance of  $10\Omega$  and inductance of  $0.04\text{ H}$  are connected in star across a 3 phase,  $50\text{ Hz}$ ,  $200\text{V}$  supply. Calculate the line current, total power absorbed, reactive volt amperes and total volt amperes. 8
- (b) With the help of a neat diagram explain how short circuit test is conducted on a single phase transformer 6
- (c) Draw the circuit diagram of a full wave centre tapped rectifier with capacitor filter and the corresponding input and output waveforms. 2
- (d) With the help of a neat diagram explain the output characteristics of an NPN transistor in common emitter configuration 4
4. (a) Using source transformation find the current flowing through the  $8\Omega$  resistance 7



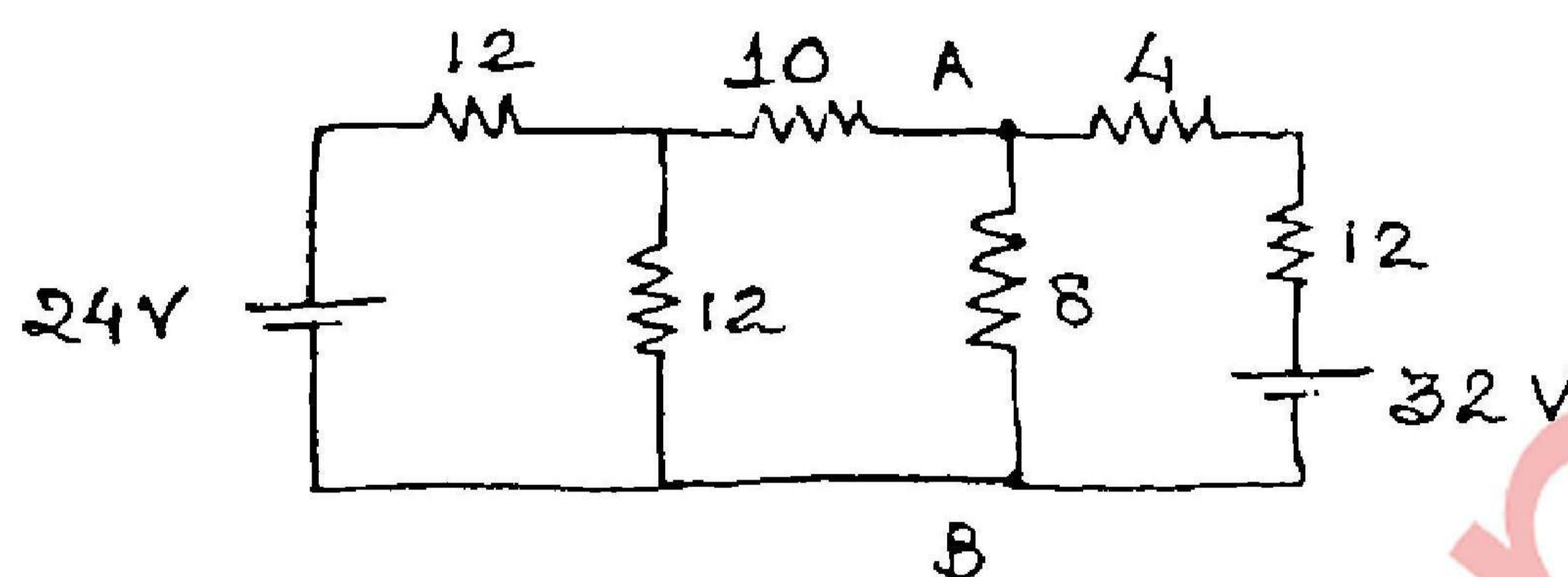
- (b) Find the rms value for the given waveform 5



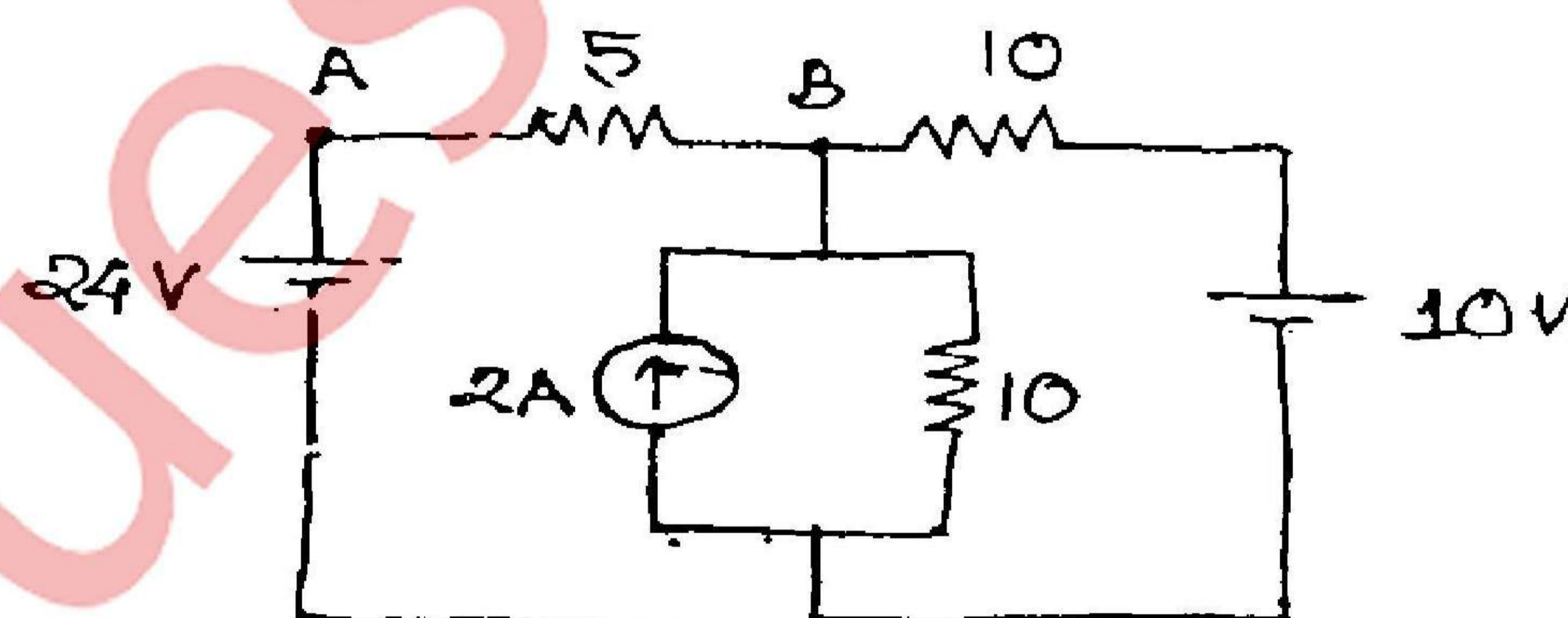
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- (c) Two wattmeters are used to measure power in a 3 $\phi$  balanced delta connected load using two wattmeter method. The readings of the 2 wattmeters are 500 W and 2500W respectively. Calculate the total power consumed by the 3 $\phi$  load and the power factor 4
- (d) With the help of a neat circuit diagram and input and output waveforms explain the working of a half wave rectifier. 4
5. (a) Find the current through 8 $\Omega$  resistance using Thevenin's theorem 8



- (b) A resistance of 10 $\Omega$  and a pure coil of inductance 31.8 mH are connected in parallel across 200V, 50 Hz supply. Find the total current and power factor. 4
- (c) A 5kVA, 1000/200V, 50 Hz, single phase transformer gave the following test results. 8
- |                    |       |        |      |
|--------------------|-------|--------|------|
| OC test (hv side): | 1000V | 0.24 A | 90W  |
| SC test(hv) side:  | 50V   | 5A     | 110W |
- Calculate the equivalent circuit parameters of the transformer and draw the equivalent circuit diagram.
6. (a) Find the value of current flowing through the 5 $\Omega$  resistance using superposition theorem. 7



- (b) A series RLC circuit has the following parameter values:  $R=10\Omega$ ,  $L=0.014H$ ,  $C=100\mu F$  Compute the resonant frequency, quality factor, bandwidth, lower cut-off frequency and upper cut-off frequency. 7
- (c) With the help of a neat circuit diagram and phasor diagram explain the 2-wattmeter method to measure power in a 3 $\phi$  balanced star connected load. 6