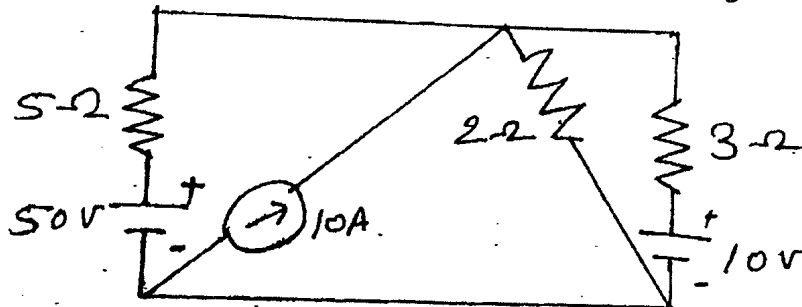
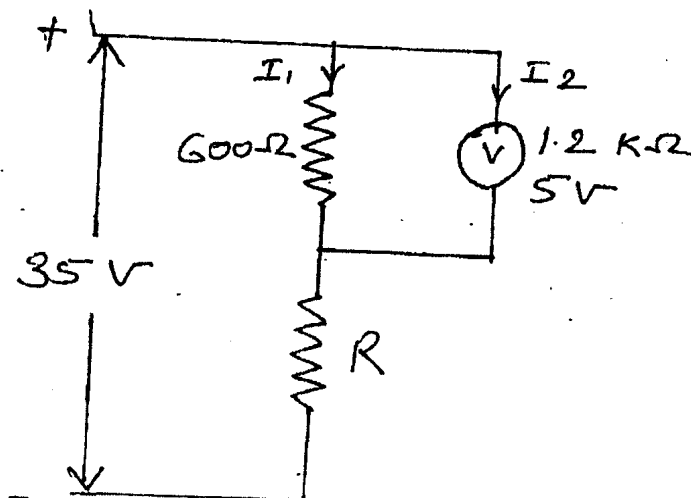


- N.B. (1) Question No. 1 is **compulsory**.
 (2) Attempt any **three** questions from the remaining **five** question.
 (3) **Figures** to the **right** side indicate **full** marks.
 (4) Assume data if **necessary**.

1. (a) Find the current flowing through 5Ω resistance using source transformation. 3



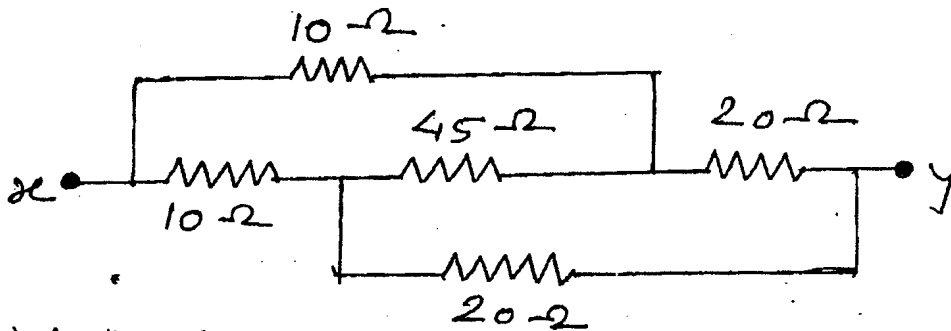
- (b) State and explain maximum power transfer theorem. 3
 (c) An alternating voltage is given by $V = 141.4 \sin 314 t$ find- 3
 (i) Frequency
 (ii) R.M.S. value
 (iii) Average value
 (iv) Instantaneous value of voltage when t is 3 msec.
 (d) Define the equation for resonance frequency (f_r) in parallel resonance circuit. 2
 (e) Write down voltage, current and power relation in balanced delta connected load. 3
 (f) Derive emf equation for single phase transformer. 4
 (g) Draw complete V-I characteristics of a Diode. 2
2. (a) Determine the value of Resistance R as shown in **Figure** using KVL and KCL. 6



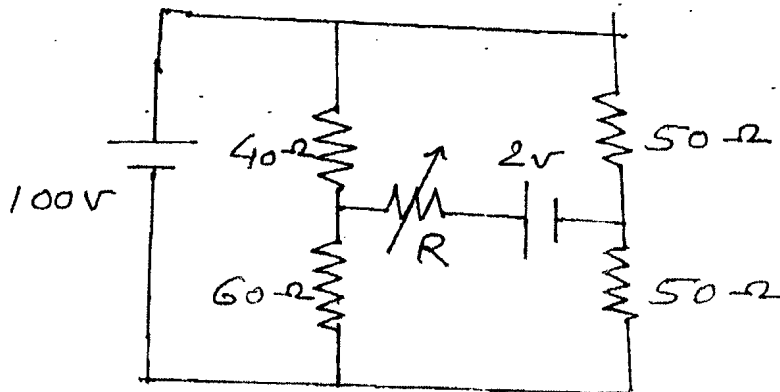
- (b) A 100Ω resistor is connected in series with a choke coil. When a 400 V , 50 Hz supply is applied to this combination, the voltage across the resistance and the choke coil are 200 V and 300 V respectively. Find the power consumed by the choke coil. Also calculate the power factor of choke coil and power factor of the circuit. 8
- (c) Draw phasor diagram of single phase transformer on resistive load (unity power factor) and inductive load (lagging power factor). 6

3. (a) Three similar coils, connected in star, take a total power of 1.5 kW at a p.f. of 0.2 lagging from a three phase, 440 V , 50 Hz supply. Calculate the resistance and inductance of each coil. 8
- (b) A $230/110 \text{ V}$, single phase transformer takes an input of 350 VA at no load and at rated voltage. The core loss is 110 w . Find (i) The iron loss component of no load current (ii) magnetizing component of no load current and (iii) No load power factor. 6
- (c) Define filter and write down types of filters. 2
- (d) Explain input characteristics of common emitter configuration. 4

4. (a) Calculate R_{xy} for the circuit shown in figure. 7

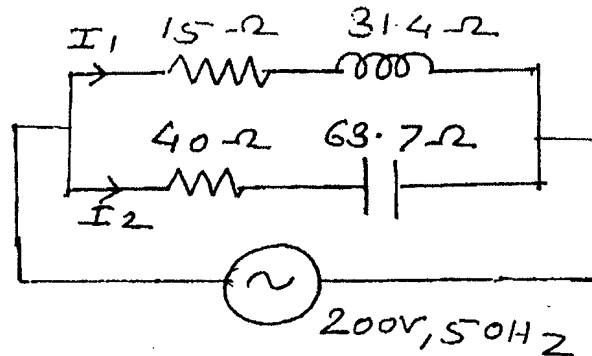


- (b) A voltage of 150 V , 50 Hz is applied to a coil of negligible resistance and inductance 0.2 H . Write the time equation for voltage and current. 5
- (c) In a balanced three phase circuit, power is measured by two wattmeters, the ratio of two wattmeter readings is $2 : 1$. Determine the power factor of the system. 4
- (d) Explain with circuit diagram and waveform working of centre tap full wave rectifier. 4
5. (a) Determine the value of R for maximum power transfer. Also find magnitude maximum power transferred. 8



- (b) Calculate the branch current I_1 and I_2 for the circuit shown in Figure.

4



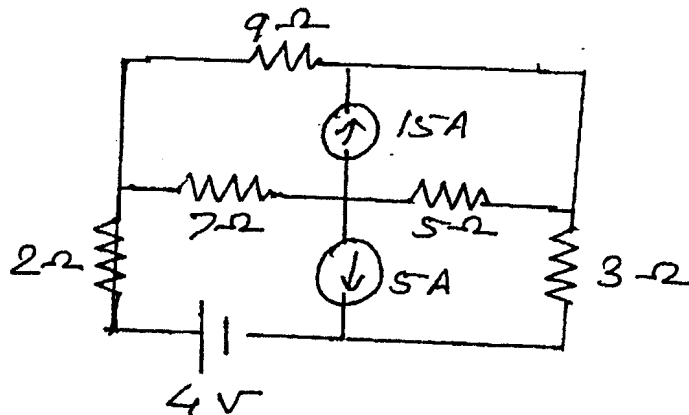
- (c) A 30 kVA, 2400/120 V, 50Hz, transformer has a high-voltage winding resistance of 0.1Ω and a leakage reactance of 0.22Ω . The low-voltage winding resistance is 0.035Ω and the leakage reactance is 0.012Ω . Calculate for the transformer—

8

- Equivalent resistance as referred to both primary and secondary
- Equivalent reactance as referred to both primary and secondary
- Equivalent impedance as referred to both primary and secondary
- Copper loss at full load.

6. (a) Find the current through 3Ω resistor using superposition theorem.

7



- (b) A resistor and a capacitor are connected in series with a variable inductor. When the circuit is connected to a 230V, 50 Hz supply, the maximum current obtained by varying the inductance is 2A. The voltage across the capacitor is 500 V. Calculate the resistance, inductor and capacitor of the circuit.

7

- (c) Explain measurement of three phase power using two wattmeter method.

6