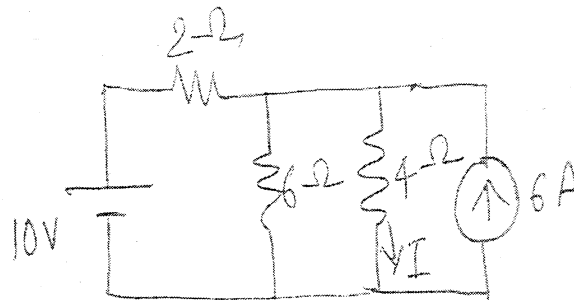


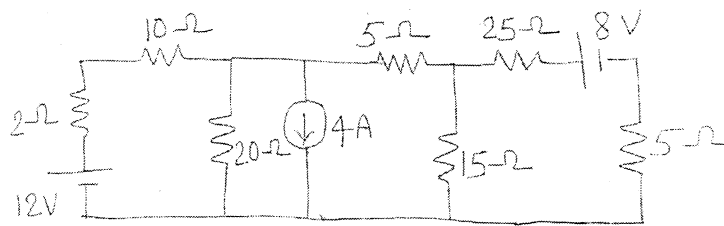
## F.E. (All Branches) (CB) (Sem-I)

- N. B. 1) Question No. 1 is **compulsory**.  
 2) Answer any **3** questions from the remaining **5** questions.  
 3) Assume suitable data wherever necessary.

- Q1 Solve the following 20  
 (a) Using source transformation, find  $I$  in the circuit shown.

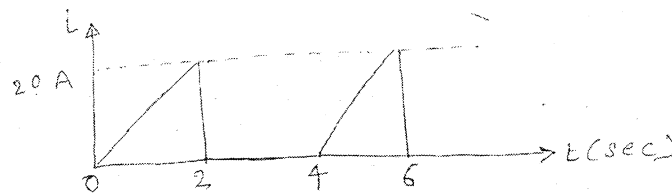


- (b) Derive emf equation for single phase transformer.  
 (c) Show that the sum of three phase emf's is zero in a three phase ac circuit.  
 (d) Compare series and parallel resonant circuit.
- Q2 (a) Coil A takes 2A at power factor of 0.8 lagging with an applied voltage of 10 V, second coil B takes 2 A with power factor of 0.7 lagging with applied voltage of 5V. What voltage will be required to produce a total current of 2 A with coil A and B in series. Find power factor in this case. 10
- (b) Draw no load phasor diagram of transformer and explain it. 6
- (c) Explain working principle of DC motor and DC generator. 4
- Q3 (a) Using Thevenin's Theorem, obtain the power drawn by  $20\Omega$  resistor in the network shown below. 10



- (b) In a balanced three phase circuit, the power is measured by two wattmeters. the ratio of wattmeter reading is 2:1. Determine the power factor of the system. 4

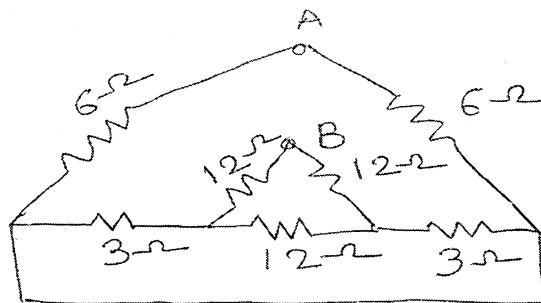
- (c) Find the RMS value of the waveform. 6



- Q4 (a) A parallel circuit consists of  $2.5\mu\text{F}$  capacitor and a coil whose resistance and inductance are  $15\Omega$  and  $260\text{ mH}$  respectively. Determine resonant frequency, Q factor of the circuit at resonance and dynamic impedance of the circuit. 7

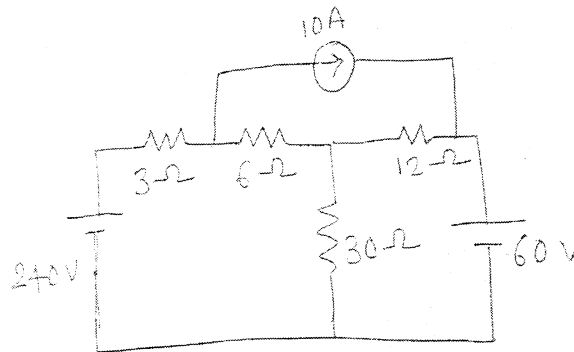
- (b) A balanced delta connected load has impedance of  $(14.151-j200)\Omega$  in each branch. Determine branch current, line current, total power taken if balanced three phase  $400\text{V}$ ,  $50\text{ Hz}$  supply is used. How much power is absorbed in each branch of delta? 6

- (c) Find the equivalent resistance between A & B. 7



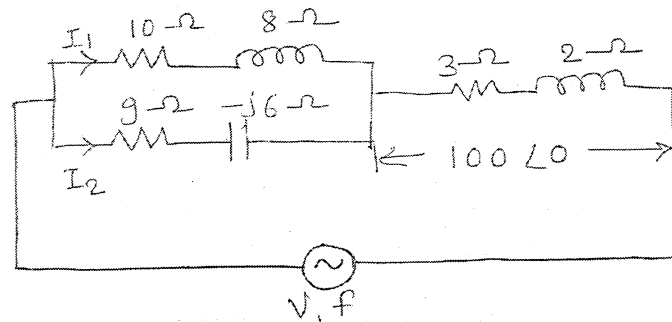
- Q5 (a) Find the current through  $6\Omega$  resistance using Nodal analysis.

7



- (b) Find  $I_1$  &  $I_2$ .

7



- (c) A single phase 440/220V, 10 KVA, 50 Hz transformer has resistance of  $0.2\Omega$  and reactance of  $0.6\Omega$  on high voltage side. The corresponding values of low voltage side are  $0.04\Omega$  and  $0.014\Omega$ . Calculate the regulation on full load for 0.8 lagging power factor.

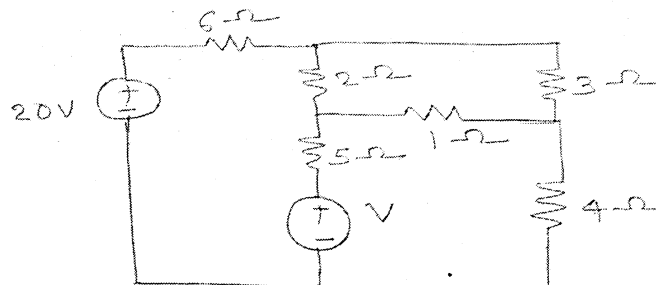
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- Q6 (a) Determine the relationship between phase and line voltage and current for star connected balanced load across a three phase balanced system.

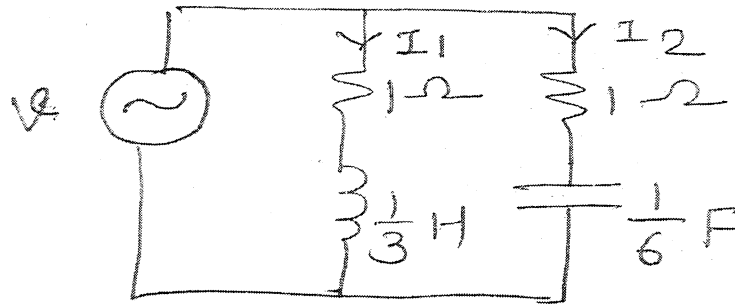
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- (b) By mesh analysis, find V.

8



- c) If  $v = 100 \sin 3t$ , determine branch current  $I_1$  &  $I_2$  with their phase angle and total current supplied by the source and its phase angle. 6



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