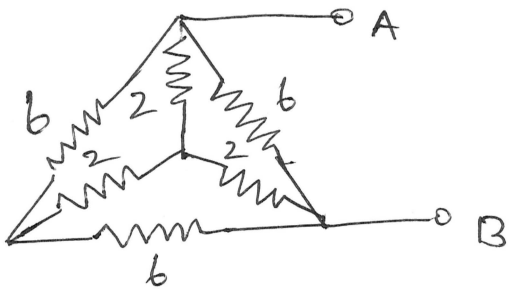
TOTAL MARKS: 80 **TIME: 3hrs**

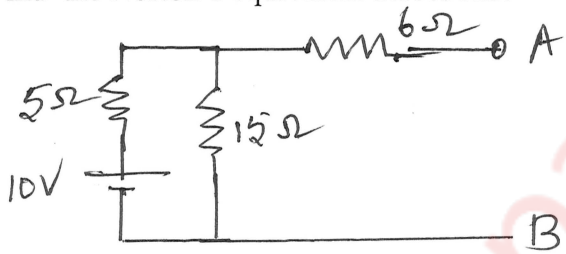
NB

1) Question No. 1 is compulsory.
2) Answer any three questions out of remaining five questions.
3) Assumption made should be clearly stated.
4) Answer to questions should be grouped together and written together.

Q1 a. Find R_{AB} 3



b. Find the Norton's equivalent across AB. 3



c. A pure inductor of 0.2 H is connected across single phse 200 V, 50 Hz supply. Write the instantaneous equation of voltage and current. 3

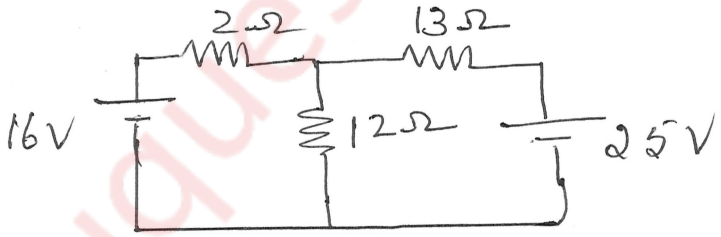
d. Write any four conditions of series resonance. 3

e. What is the phase line relation in star connected system? 2

f. Explain the working of a single phase transformer under load 4

g. Illustrate the working of half wave rectifier. 2

Q2 a. Using Mesh analysis find current through 2 Ω resistor. 6



b. The impedances (8+6) Ω and (10-j10)Ω are connected in parallel across voltage of $230\angle 0$. Determine current in each branch and kVA, kVAR, kW and power factor of the whole circuit. 8

[TURN OVER

c. Derive emf equation of a single phase transformer 6

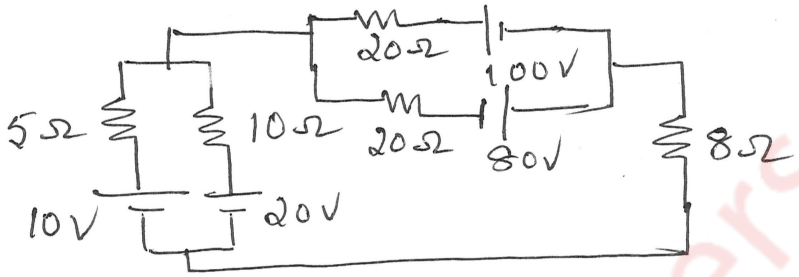
Q3 a. Calculate the phase and line currents in a balanced delta connected load taking 75 kW at a power factor of 0.8 lag from a three phase 440 V supply. Also calculate the per phase impedance. 8

b. Illustrate with neat circuit diagram the procedure for conducting open circuit test and short circuit test. 6

c. Illustrate with neat diagram and explain the input characteristics of an NPN transistor in CE configuration. 4

d. Draw the circuit diagram and output voltage waveform of a full wave rectifier with capacitor filter. 2

Q4 a. Find current through 8 Ω resistor using source transformation. 7

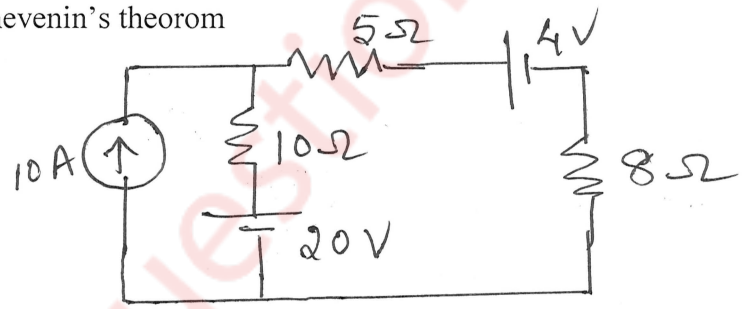


b. Three identical coils each having a resistance of 10 Ω and an inductive reactance of 10 Ω are connected in star across 400 V three phase supply. Find the reading on each of the watt meters connected to measure the power 4

c. Define the rms value of an ac quantity. 5

d. Derive rectification efficiency and ripple factor of a full wave bridge tapped rectifier. 4

Q5 a. Determine the current through 8 Ω resistor in the network using Thevenin's theorom 8

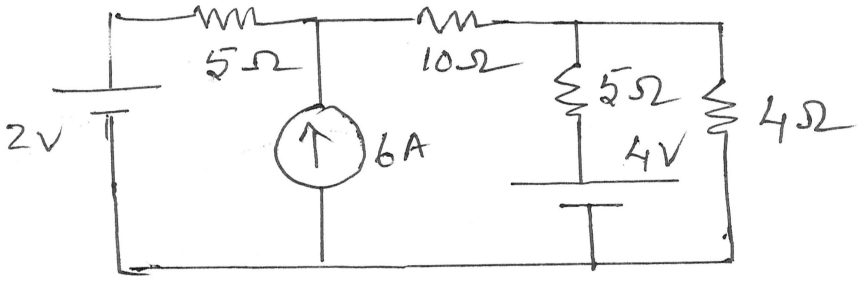


b. An rms voltage of $100\angle 0$ is applied to an impedance $Z = 20\angle 30$. Find the current through the circuit and power factor of the circuit. 4

c. Derive the conditions for maximum efficiency of a single phase transformer. 8

[TURN OVER

Q6 a. Find current through 4 Ω resistor using superposition theorem. 7



b. A series R-L-C circuit with R=10 Ω, L=0.014 H and C=10 μF is connected across 230V variable frequency supply. 7
Calculate a) resonance frequency b) current at resonance c) Q-factor d) voltage across inductor and capacitor and e) power factor at resonance.

c. Prove that the power and power factor in a balanced three phase circuit can be calculated from the reading of two watt meters. Draw relevant connections and phasor diagram. 6

EE3BC0983D326D114F812BDFD2C6D638