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B.E / B.Tech. (Full time) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2011
ELECTRICAL AND ELECTRONICS ENGINEERING BRANCH

SECOND SEMESTER

EE 181 ELECTRIC CIRCUIT ANALYSIS

(REGULATIONS 2004)

Time: 3 Hours

Max. Marks: 100

Answer ALL Questions

PART -A

(10 x 2 = 20)

1. A voltage wave is represented by $v = 200\sin 314t$, find the RMS and Average value of the wave.
2. Define the term Form Factor.
3. Draw the charging current profile in a R-L circuit.
4. Derive the Laplace transform for a unit step function.
5. Draw the phasor diagram for a series RLC circuit.
6. What are the properties of a series RLC resonance circuit?
7. What do you mean by the terms node and junction?
8. Define Tellegen's theorem.
9. Explain the Dot convention in coupled circuits.
10. A star connected load has impedance of $(3+j4)$ ohm in each phase and is connected across a balanced three phase delta connected alternator having line voltage of 120 V. Obtain the line current for the load.

PART -B

(5 x 16 = 80)

11. (a) A periodic voltage waveform has been shown in figure 1. Determine (i) Frequency of the waveform (ii) Wave equation for $0 < t < 100$ msec (iii) RMS value (iv) Average value and (v) Form factor (8)
- (b) Find the power loss in the 1Ω resistor as shown in Figure 2. (8)

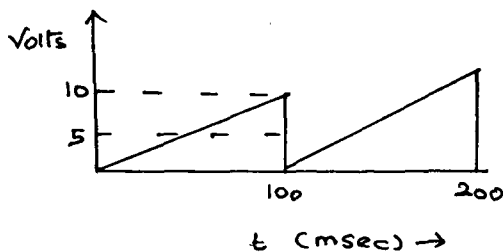


FIGURE 1

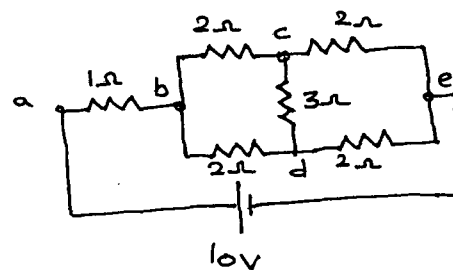


FIGURE 2

12. (a) Explain the transient response in RC series having DC excitation and draw the waveforms during charging and discharging modes.

(OR)

(b) (i) Explain the step response of RL circuit and derive the current response. (8)

(ii) Find the driving point impedance for the network shown in figure 3. (8)

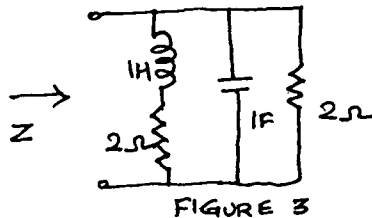


FIGURE 3

13. (a) Explain the sinusoidal response of series RLC circuit with neat phasor diagram.

(OR)

(b) (i) A series LCR circuit has inductance of 10 mH and resistance of 2 ohms. What is the value of capacitance that will produce resonance. Also find the current at resonance frequency and the maximum instantaneous energy stored in the inductance at resonance. Assume the supply as 230 V, 10000Hz. (8)

(ii) Derive the Q factor in series resonating circuit. (8)

14. (a) (i) Write down rules for constructing nodal admittance matrix for solving the matrix equation. (8)

(ii) Find the current and voltage drops through 5 Ω resistor for the given figure 4. (8)

(OR)

(b) Write down thevenin's theorem. What are its merits and demerits? Find the current through 10 Ω resistor using Thevenin's theorem for the figure 5.

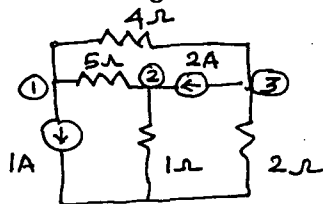


FIGURE 4

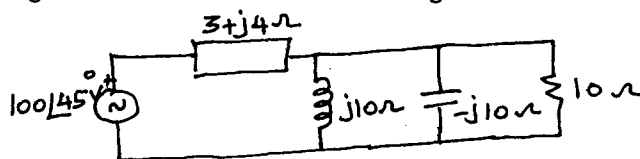


FIGURE 5

15. (a) (i) Write short notes on

(1) Coefficient of Coupling (8)

(2) Series connection of coupled coils (8)

(OR)

(b) Explain the measurement of power and power factor of a balanced and unbalanced load in a three phase system.