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Question Paper Code : 91029

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2025.

Second Semester

Electrical and Electronics Engineering

EE 3251 — ELECTRIC CIRCUIT ANALYSIS

(Common to : Electronics and Instrumentation Engineering/Instrumentation and Control Engineering)

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Define: RMS value.
2. Distinguish between series and parallel circuit.
3. How will you express the Norton's equivalent circuit from Thevenin's equivalent circuit?
4. Mention the application of maximum power transfer theorem.
5. Distinguish between transient response and steady state response of a circuit.
6. Write the properties of Laplace transform.
7. How does selectivity related to bandwidth?
8. State the dot rule for coupled circuits.
9. Compare: Star and Delta connected system.
10. Write the advantages of 3 phase system over 1 phase system.

PART B — ($5 \times 13 = 65$ marks)

11. (a) (i) Obtain the average value, rms value, form factor and peak factor for the waveform shown in Fig. 11 (a) (i). (7)

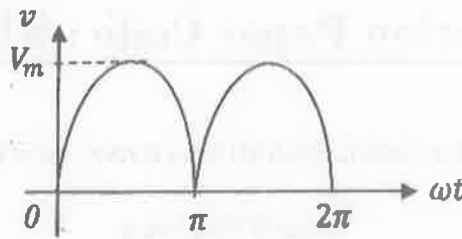


Fig. 11 (a) (i)

- (ii) Find the current through the $2\ \Omega$ resistor in the network of Fig. 11 (a) (ii) by mesh analysis. (6)

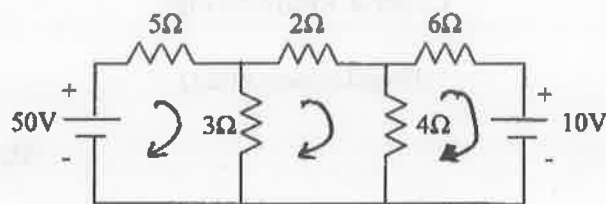


Fig. 11 (a) (ii)

Or

- (b) (i) Find the voltage across the $5\ \Omega$ resistor is shown in Fig. 11 (b) (i) (7)

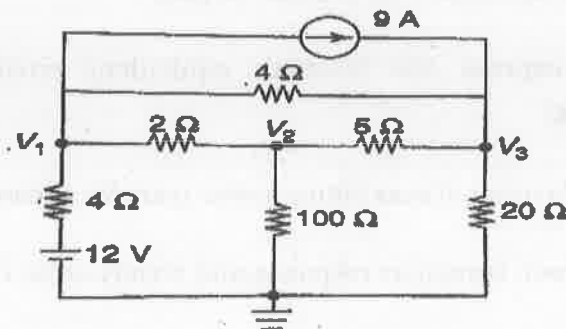


Fig. 11 (b) (i)

- (ii) An inductive coil having negligible resistance and 0.1 Henry inductance is connected across a 200 V , 50 Hz AC supply. Calculate the (1) Inductive Reactance (2) RMS value of current (3) Power (4) Power Factor. (6)

12. (a) (i) Write the steps for Norton's theorem and Obtain the Norton's equivalent circuit at the terminals AB for the circuit of Fig. 12 (a) (i) (7)

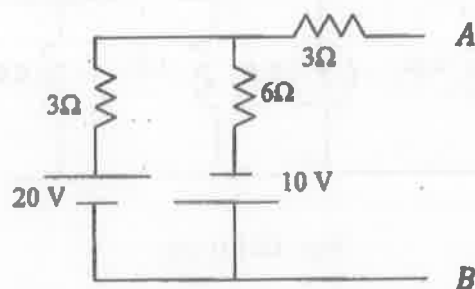


Fig. 12 (a) (i)

- (ii) State the Thevenin's theorem and Find the power loss in R_L by using Thevenin's theorem in Fig. 12 (a) (ii) (6)

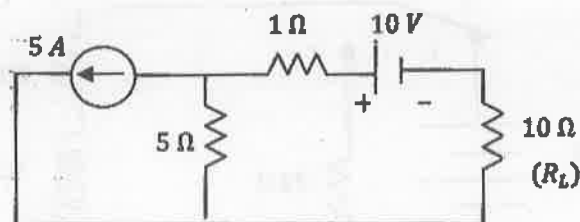


Fig. 12 (a) (ii)

Or

- (b) (i) For the circuit shown in Fig. 12 (b) (i), determine the value of R_L to get the maximum power and also find this power. (7)

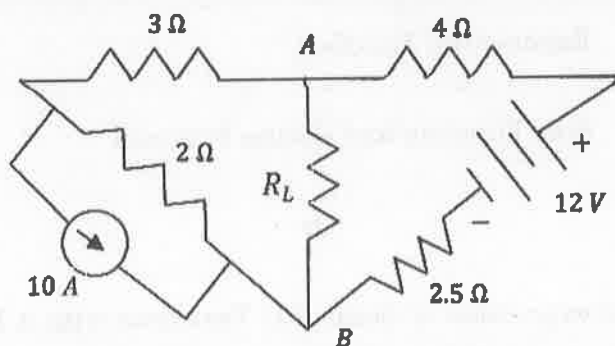


Fig. 12 (b) (i)

- (ii) For the circuit in Fig. 12 (b) (ii) find the current through $3\ \Omega$ resistor by superposition theorem. (6)

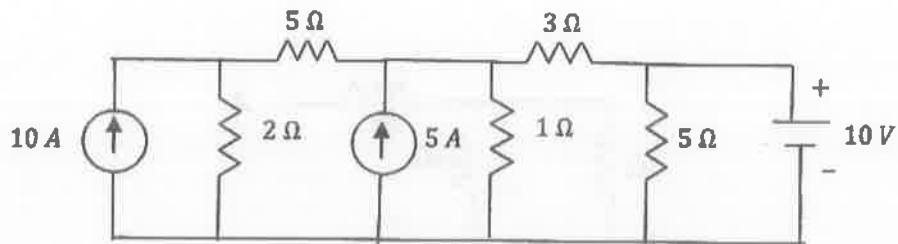


Fig. 12 (b) (ii)

13. (a) (i) In the circuit of Fig. 13 (a) (i), the switch S has been in position 1 for sufficient time to establish steady-state conditions. The switch is then moved to position 2. Find the current transient. (7)

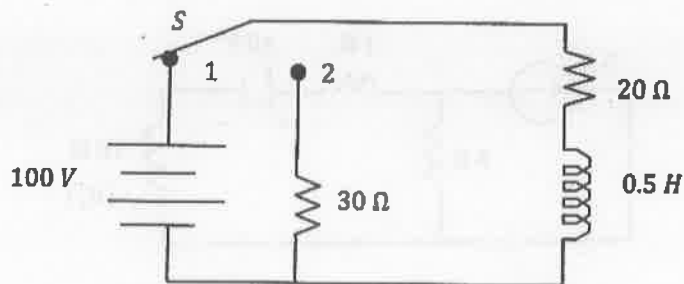


Fig. 13 (a) (i)

- (ii) Evaluate the Laplace Transform for the following Functions

- (1) Step Function (2)
- (2) Exponential Function (2)
- (3) Sine Function and Cosine Function (2)

Or

- (b) Derive the expression of Series RC Transient with a DC voltage applied through it obtain Current, Voltage, Power, Energy produced and Decay transient of the circuit.