



B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2023

(Regulation 2018)

Second Semester

B.E ELECTRICAL AND ELECTRONICS ENGINEERING

U18EEI2201: Electric Circuit Analysis

COURSE OUTCOMES

CO1: Reduce the complex circuits using reduction techniques and source transformations.

CO2: Analyse and measure the response of AC circuits.

CO3: Apply network theorem to compute the electrical parameters of circuit and demonstrate in hardware.

CO4: Familiarize with the concepts of magnetic circuits and analyse its parameters.

CO5: Understand the 3 phase circuit concepts with balanced and unbalanced loads.

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

- | | | |
|---|-----|-------------------|
| 1. Find the total resistance of the circuit if the resistances $R_1=12$ ohms and $R_2= 8$ ohms are connected in parallel. | CO1 | [K ₂] |
| 2. State Kirchhoff's Current and Voltage laws. | CO1 | [K ₂] |
| 3. Draw the power triangle. | CO2 | [K ₂] |
| 4. Define Q factor. | CO2 | [K ₂] |
| 5. State Thevenin's theorem. | CO3 | [K ₂] |
| 6. State Maximum Power Transfer Theorem. | CO3 | [K ₂] |
| 7. Define self and mutual inductances. | CO4 | [K ₂] |
| 8. List any two comparisons of electric and magnetic circuits. | CO4 | [K ₂] |
| 9. Define Line voltage and phase voltage. | CO5 | [K ₂] |
| 10. What is meant by a balanced system? | CO5 | [K ₃] |

Answer any FIVE Questions:-

PART B (5 x 16 = 80 Marks)

(Answer not more than 400 words)

- | | | | |
|---|---|-----|-------------------|
| 11. a) Determine the unknown voltage V_1 in the circuit in Figure 1 using KVL. Also find the current through the circuit and resistance R_1 , if the resistance R_2 is 10 ohms. | 8 | CO1 | [K ₃] |
|---|---|-----|-------------------|

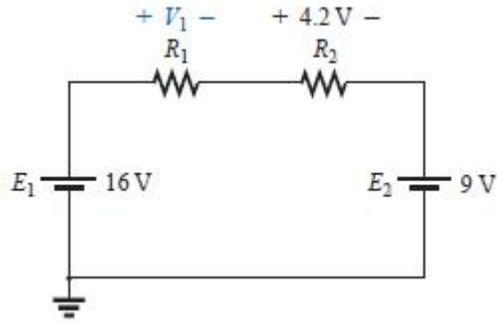


Figure 1

- b) Determine the R_{ab} for the network given in Figure 2 using star-delta transformation. 8 CO1 [K3]
transformation.

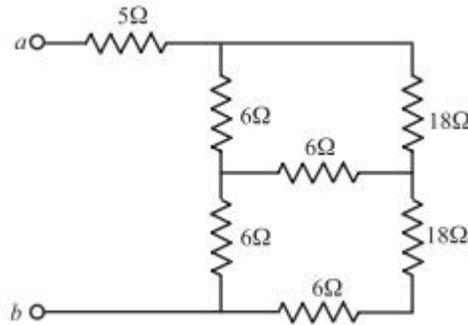


Figure 2

12. a) . Explain with neat diagram the Series resonant circuit. 10 CO2 [K2]
b) Derive an expression for the average value of a sinusoidal voltage. 6 CO2 [K2]
13. a) Determine all the mesh currents and all branch currents for the circuit given in Figure 3 using Mesh Analysis. 16 CO3 [K3]

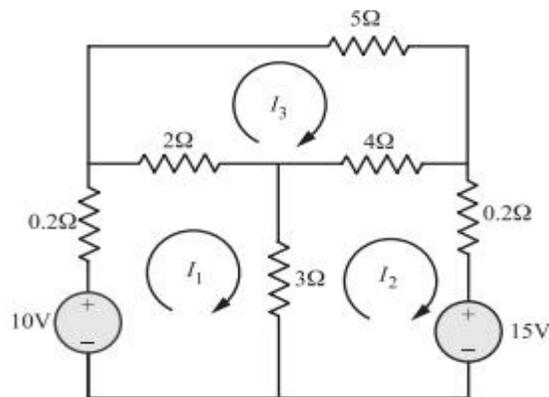


Figure 3

14. a) Determine the current i_0 in circuit given in Figure 4 using superposition theorem. 16 CO3 [K2]

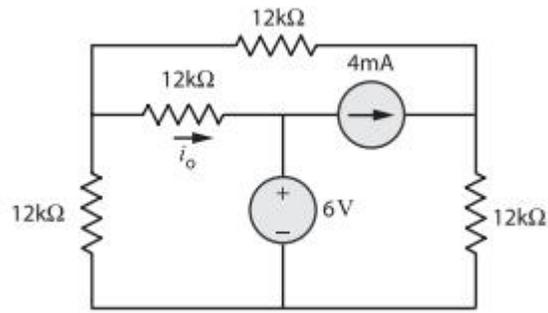


Figure 4

15. a) Illustrate about Magnetic leakage and Fringing effect in magnetic circuits 8 CO4 [K₂]
 b) Find the total inductance of the series coils of Figure 5 using dot convention. 8 CO4 [K₃]

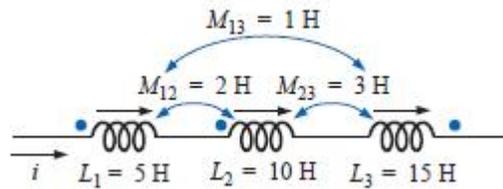


Figure 5

16. a) With neat diagram, explain the three-phase power measurement by two-wattmeter method. 12 CO5 [K₂]
 b) Explain with neat diagram the star connected generator connected to balanced star connected load. 4 CO5 [K₃]
