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VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 80037

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JAN. / FEB. 2026

Second Semester

Electrical and Electronics Engineering

U23EE202 – ELECTRIC CIRCUIT THEORY

(Regulation 2023)

Time: Three Hours

Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

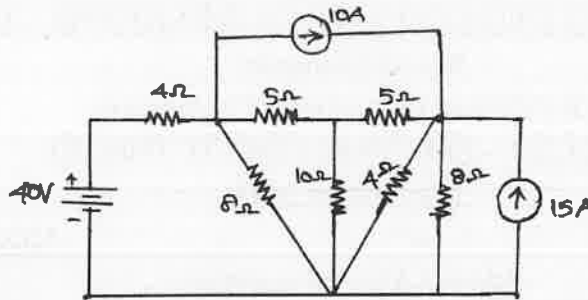
(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	State Kirchhoff's current law and voltage law.	2	K1	CO1
2.	Two resistances when connected in series, the effective value of resistance are 100 Ohms. When connected in parallel the effective value is 24 Ohms. Calculate the value of resistances R_1 and R_2 .	2	K2	CO1
3.	Express Thevenin's Theorem and Norton's Theorem.	2	K1	CO2
4.	A load is connected to a network of the terminals to which load is connected in which $R_{th}=10$ Ohms and $V_{th}=40$ Volts. Calculate the maximum power supplied to the load.	2	K2	CO2
5.	Write the expression which relates the self and mutual inductance.	2	K2	CO3
6.	Two coupled coils with $L_1=0.02$ H, $L_2=0.01$ H and $K=0.5$ are connected in series aiding arrangement. Obtain the equivalent inductance.	2	K2	CO3
7.	Distinguish between balanced load and unbalanced load.	2	K1	CO4
8.	A three phase motor can be regarded as a balanced Y load. Motor draws 5.6kW when the line current is 18.2A. Estimate the power factor of the motor.	2	K2	CO4
9.	Define two port network.	2	K1	CO5
10.	Mention the condition for reciprocal and symmetrical in two port networks.	2	K1	CO5

PART - B

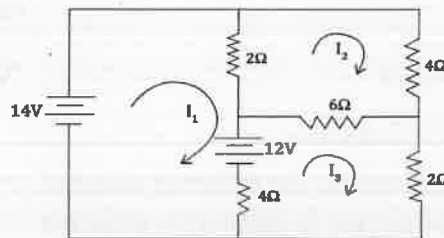
(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	Use nodal voltage method to estimate the power dissipated in the $10\ \Omega$ resistance for the given circuit.	13	K2	CO1

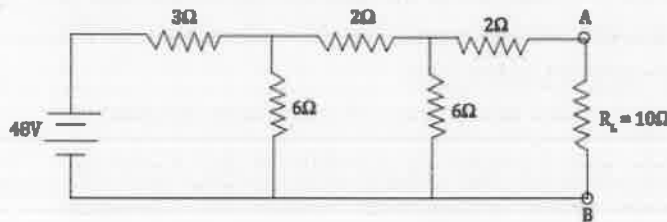


(OR)

b)	Determine the loop currents I_1 , I_2 and I_3 by mesh analysis for the circuit shown.	13	K2	CO1
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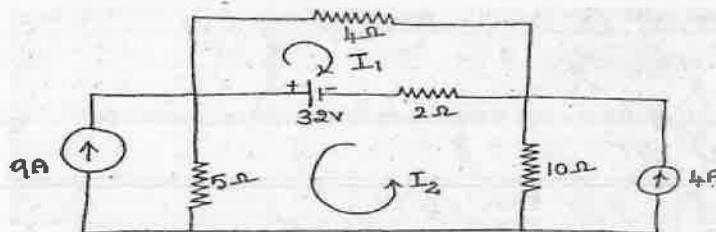


12. a)	Using Thevenin's theorem, evaluate the current through $R_L=10\ \Omega$ in the given circuit and find the power consumed by load.	13	K2	CO2
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(OR)

b)	Estimate the current through $5\ \Omega$ resistor using superposition theorem, in the given circuit.	13	K2	CO2
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13. a) Derive the mutual inductance and the coupling coefficient of the transformer with necessary diagrams. 13 K2 CO3

(OR)

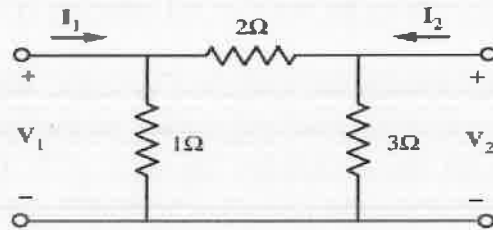
b) Draw the circuit diagram for parallel resonance circuit and derive the expression for Q factor and bandwidth. 13 K2 CO3

14. a) A 400V, three phase supply feeds an unbalanced three wire, star connected load. The branch impedances of the load are $Z_R=(4+j8)\ \Omega$; $Z_Y=(3+j4)\ \Omega$ and $Z_B=(15+j20)\ \Omega$. Find the line currents and voltage across each phase impedance. Assume RYB phase sequence 13 K2 CO4

(OR)

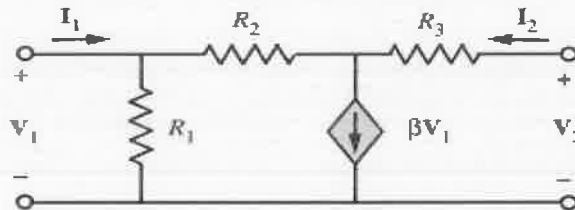
b) Explain the three phase power measurement using two wattmeter method. 13 K3 CO4

15. a) Find the y parameters of the two-port network shown. Then, determine the current in a $4\ \Omega$ load, that is connected to the output port when a 2A source is applied at the input port. 13 K2 CO5



(OR)

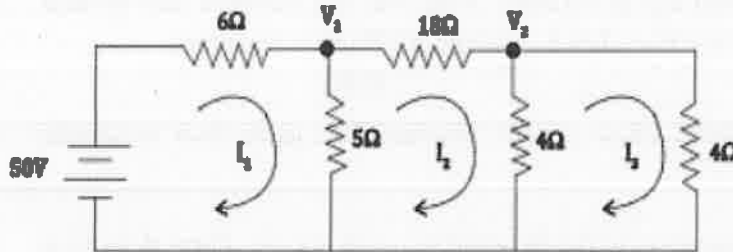
b) Determine the z parameters for the two port network shown. 13 K2 CO5



PART – C

(1 x 15 = 15Marks)

Q.No.	Questions	Marks	KL	CO
16. a)	Find V_1 , V_2 by nodal analysis and I_1 , I_2 , I_3 by mesh analysis method for the network as shown.	15	K2	CO2



(OR)

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|----|-----|---|----|----|-----|
| b) | i. | Derive the expressions for resistors and inductors in series and parallel. (7) | 15 | K2 | CO1 |
| | ii. | Two 50 ohms resistors are connected in series. When a resistor R is connected across one of them, the total circuit resistance is 60 ohms. Calculate the value of R. If the supply voltage across the above circuit is 60V, find the current passing through individual resistance. (8) | | | |