Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025

Third Semester

Biomedical Engineering

UBMT24302 – Electric Circuit Analysis

Regulations - 2024

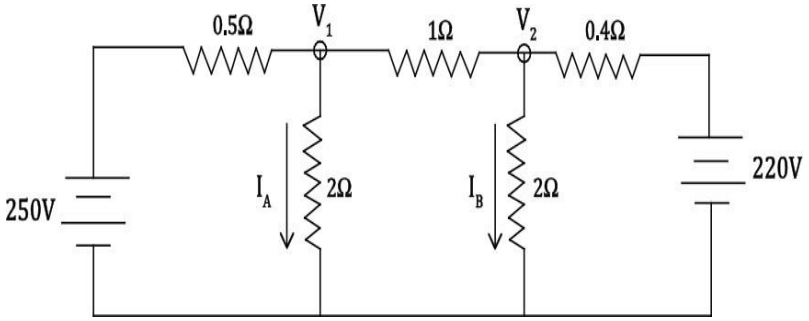
Duration : 3 Hrs *Maximum : 100 Marks*

*PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)*

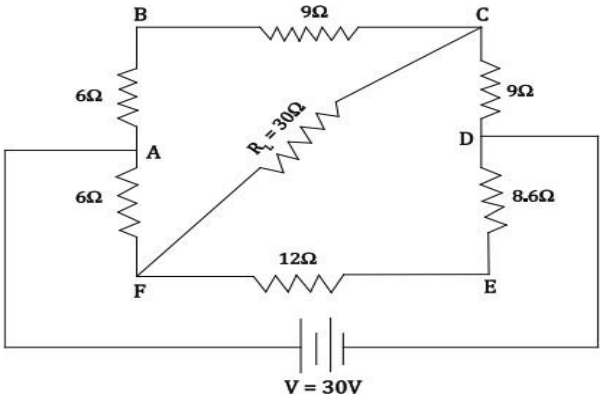
Q.No	*Questions*	*BTL*	*CO*	*Marks*
1.	State Ohm's law. Mention the limitations of ohm's law?	L2	1	2
2.	Two capacitance C_1, C_2 of the values10μF and 5μF respectively are connected in series. Relate the equivalent capacitance.	L2	1	2
3.	Give the steps to find Thevenin's voltage.	L1	2	2
4.	State Norton's theorem.	L1	2	2
5.	Define the term time constant.	L1	3	2
6.	What is meant by transient time?	L1	3	2
7.	Define co-efficient of coupling. Give the expression for coefficient of coupling.	L1	4	2
8.	Define bandwidth of the resonant circuit.	L1	4	2
9.	Differentiate between linear transformer and ideal transformer.	L2	5	2
10.	What is a tree in network topology?	L1	5	2

*PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)*

Q.No			*Questions*	*BLT*	*CO*	*Marks*
11.	a	i	Distinguish between series and parallel circuits.	L3	1	6
		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.	L3	1	10
			Or			
	b		Find the values of $V_1$and V_2 and I_A and I_B by Nodal analysis method as shown in Fig.	L3	1	16

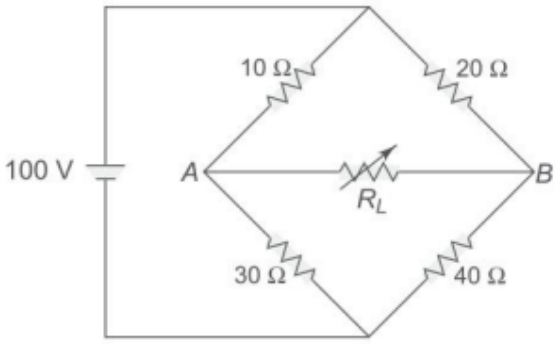


12.	a	By applying Thevenin's Theorem Calculate (i) Thevenin's voltage across FC (ii) Thevenin's Resistance between FC (iii) Load Current for the circuit as shown in Fig. in which RL=30 Ohm.	L3	2	16



Or

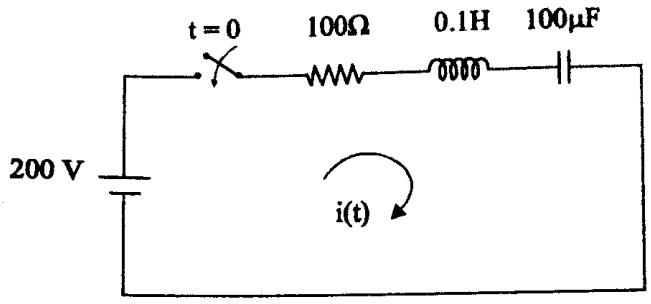
	b	Determine the load resistance to receive maximum power from the source; also find the maximum power delivered to the load in the circuit shown in Fig.	L3	2	16



13.	a	Derive the transient response of series R-L-C circuit, with DC input, using Laplace transform. **(i)** Discuss the cases of over-damping, critical–damping and under-damping. **(ii)** Express the solution in terms of under damped natural frequency, damped natural frequency and damping factor. **(iii)** Sketch the transient response curve for three cases.	L3	3	16

Or

	b	A series circuit with R =100 Ω, L =0.1 H and C =100 μF has a DC voltage of 200 V applied to it at t= 0 through a switch. Find the expression for the transient current. Assume initially relaxed circuit conditions.	L3	3	16



14.	a		Derive the mutual inductance and the coupling coefficient of transformer with necessary illustration.	L3	4	16
			Or			
	b		What is meant by Resonance in AC Circuit? In Series Resonance Explain the following terms (i) Circuit Diagram (ii)Impendence (iii) Phasor Diagram (iv) Reactance Curve (v) Variation of impedance (vi) Selectivity of Q-factor.	L3	4	16
15.	a	i	Explain magnetically coupled circuits with neat diagrams.	L2	5	8
		ii	Explain mutually coupled system and Derive the expression for energy stored.	L3	5	8
			Or			
	b		With a neat example, explain the formation of a tree, co-tree, twigs, and links in network topology.	L2	5	16