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CBCS SCHEME - Make-Up Exam

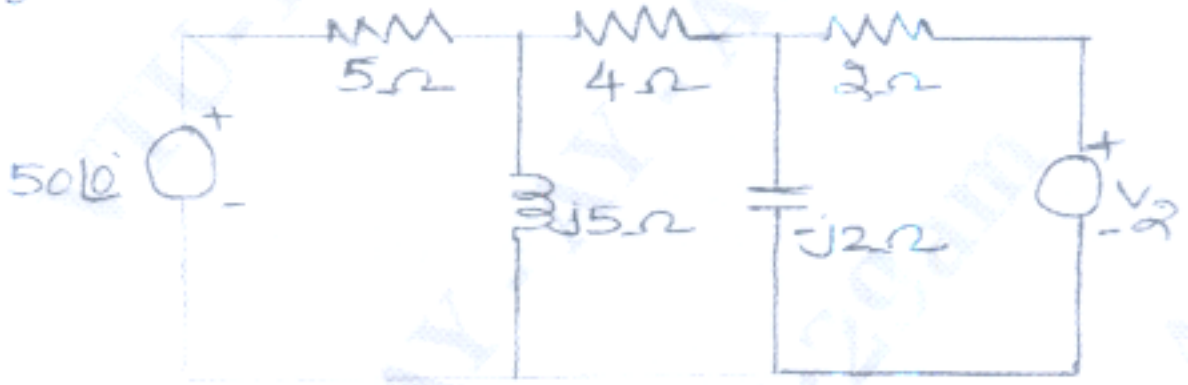
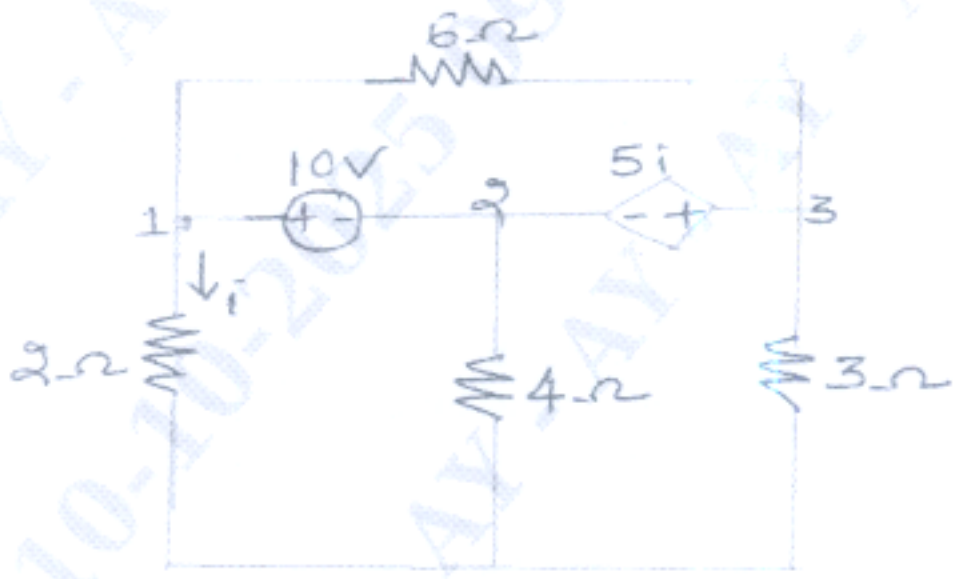
USN | | | | | | | | | | |

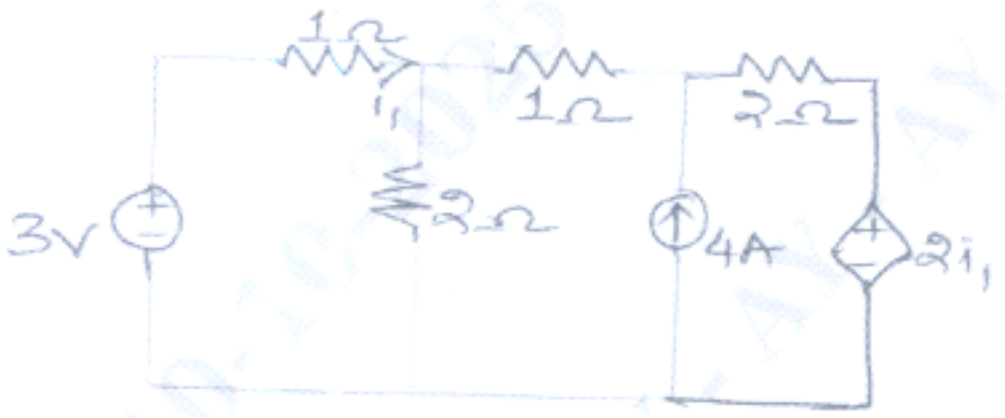
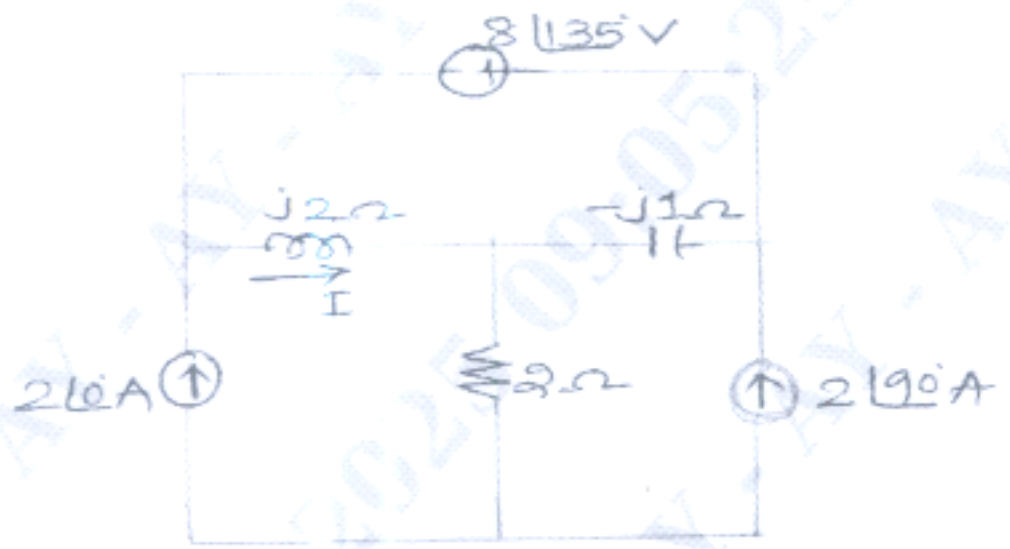
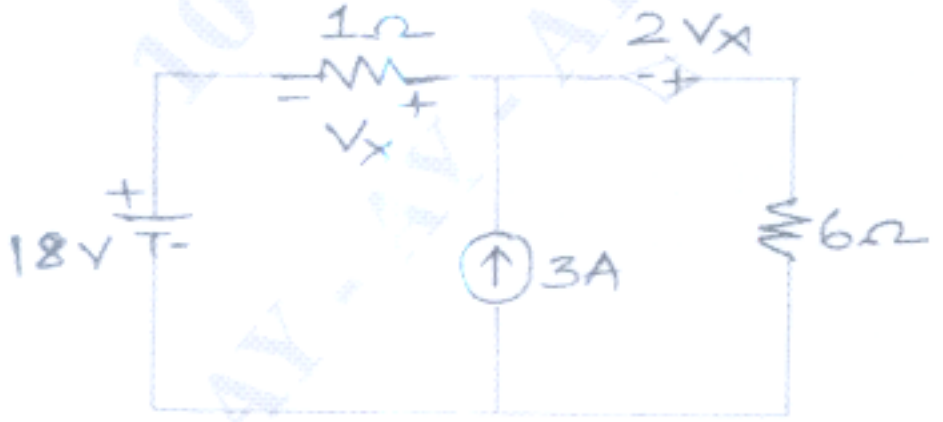
BEE302

Third Semester B.E/B.Tech. Degree Examination, June/July 2025
Electric Circuit Analysis

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any FIVE full questions, choosing ONE full question from each module.*
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
1	a.	Explain source shifting and source transformation of voltage and current sources with an example for each.	8	L1	CO1
	b.	Using the mesh current method, determine V_2 that results in zero current through 4Ω resistor.  Fig. Q. 1(b)	6	L3	CO1
	c.	Find the voltages at nodes 1, 2, 3 for the n/w shown in fig1. (c) using nodal Analysis.  Fig. Q 1 (c)	6	L3	CO1

		OR			
2	a.	Distinguish between : i) Active and Passive elements ii) Ideal and Practical sources.	6	L1	CO1
	b.	Find the currents i_1, i_2 and i_3 in the network given in Fig. Q. 2 (b) using mesh analysis.  Fig. Q 2 (b)	6	L3	CO1
	c.	Explain the concept of supermesh analysis with a suitable circuit diagram.	8	L3	CO1
		Module – 2			
3	a.	State and explain Superposition Theorem.	6	L1	CO2
	b.	Using the Superposition Theorem, obtain the reponse I for the network shown in Fig. 3 (b).  Fig.Q 3 (b)	8	L3	CO2
	c.	Find the Thevenin's Voltage short circuit current and determine the actual current flowing through the 6 Ω resistor in the network given in Fig. Q. 3 (c).  Fig. Q. 3 (c)	6	L3	CO2

OR

4	a.	State and prove Thevenin's Theorem.	6	L1	CO2
	b.	Find the Thevenin's equivalent of the network shown in Fig. Q. 4 (b).	8	L3	CO2

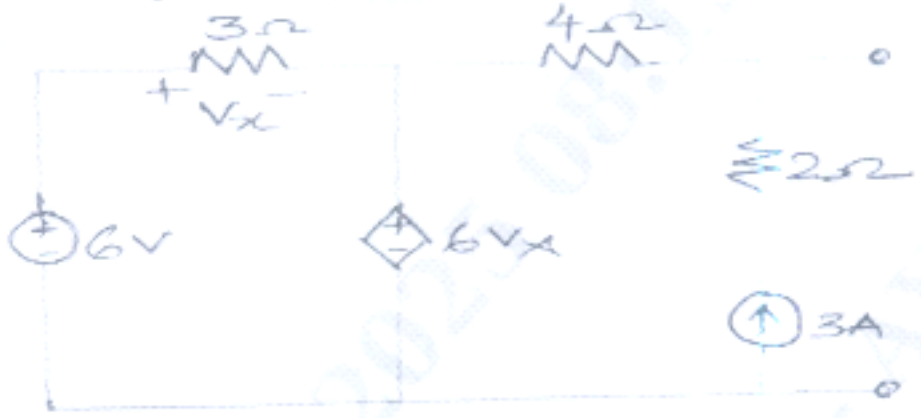


Fig. Q. 4 (b)

	c.	What will be the value of R_L to get maximum power delivered to it? What is the value of this power? Refer the network shown in Fig. Q. 4 (c).	6	L3	CO2

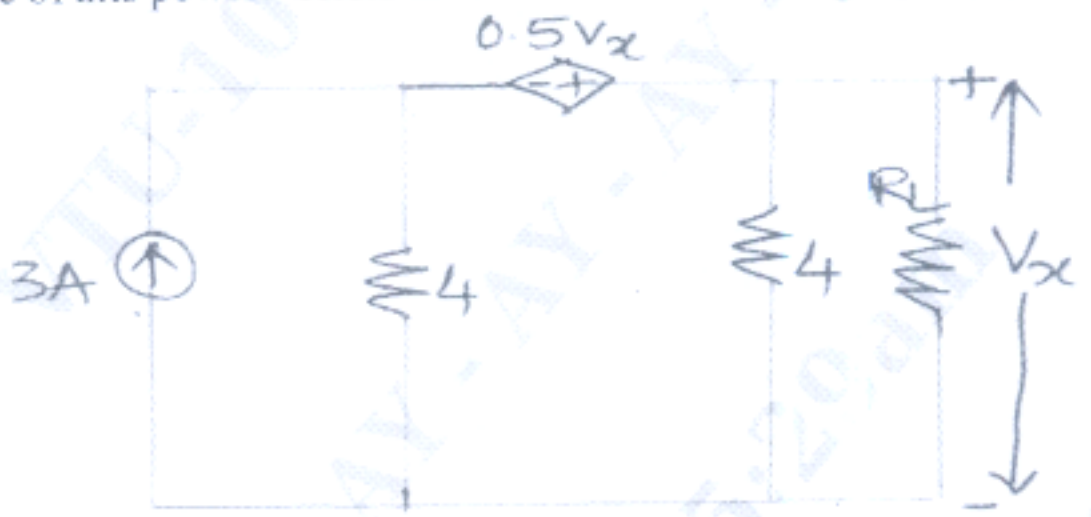


Fig. Q 4.(c)

Module – 3

5	a.	Derive expressions for resonant frequency in series RLC circuit.	6	L3	CO2
	b.	A series RLC circuit has R = 4Ω , L = 1 mH, C = 10 μF. Calculate Q Factor, bandwidth, resonant frequency and half power frequencies.	8	L3	CO2
	c.	Find the equation of current if the switch is closed at t = 0. Find also the voltage across L and R, the current at t = 0.1 sec. and the time at which the voltage across L and R are equal in Fig. Q 5 (c).	6	L3	CO2

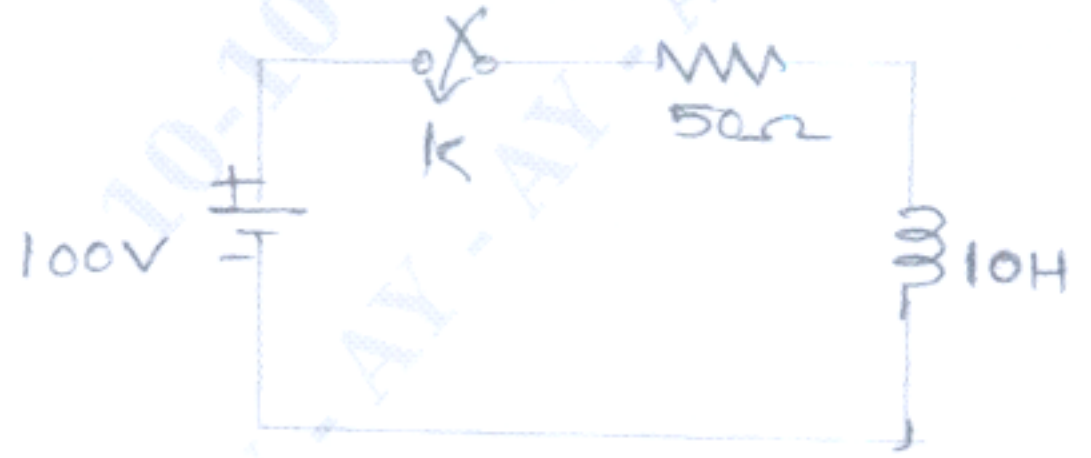


Fig. Q. 5 (c)

OR

6	a.	Find I_0, I_c , I_L Q factor, resonant frequency and parallel resonance for the parallel resonant circuit shown in Fig. Q 6 (a).	8	L3	CO3

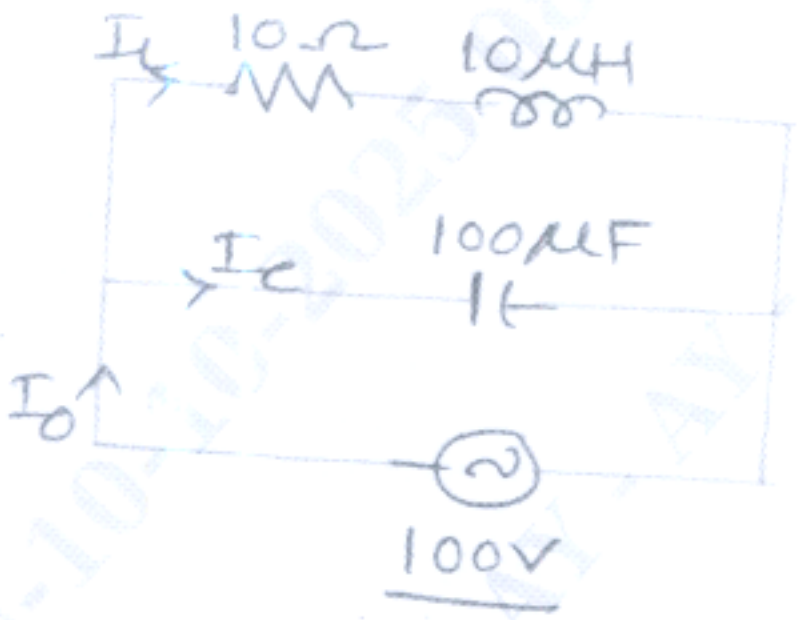


Fig. Q. 6 (a)

	b.	In the Fig. Q. 6 (b), the switch S is closed at t = 0, find the time when the current from the battery reaches to 500 mA.	8	L3	CO3

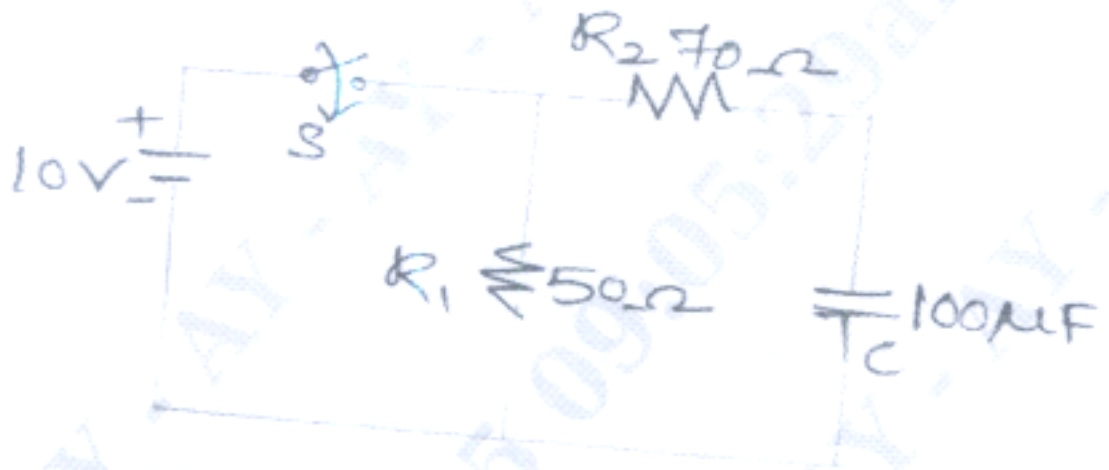


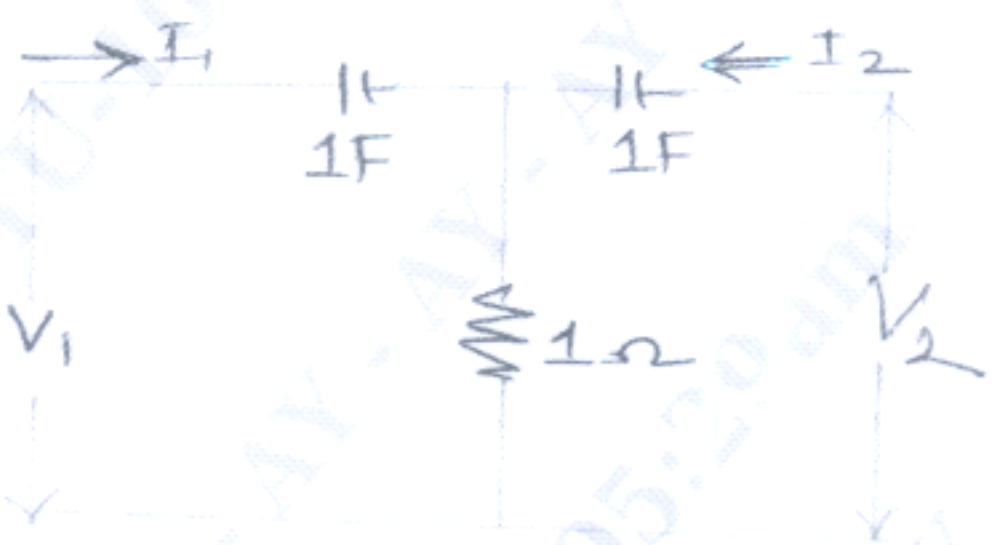
Fig. Q.6 (b)

	c.	What are the Initial conditions and their use in network analysis.	4	L1	CO2

Module – 4

7	a.	State and explain the initial value theorem and final value theorem.	10	L3	CO4
	b.	Obtain the Laplace transform of a periodic function with a suitable example. Also find the Laplace transform of the following wavefrom shown in Fig. Q. 7 (b).	10	L3	CO4

Fig. Q. 7 (b)

		OR			
8	a.	Find the Laplace transform of the following. i) Sin^2t ii) Cos^2t iii) sinwt iv) $\int_0^t i(t)\,dt$	**10**	**L4**	**CO4**
	b.	Find the inverse Lapace transform. i) $\frac{s^2+5}{s(s^2+2s+4)}$ ii) $\frac{2s+6}{s^2+6s+25}$	**10**	**L4**	**CO4**
		Module – 5			
9	a.	Derive Y – parameters and transmission parameters in terms of z – parameters.	**10**	**L4**	**CO5**
	b.	Find the transmission parameters for the given R – C network shown in Fig. Q. 9 (b).  Fig. Q. 9 (b)	**10**	**L3**	**CO5**
		OR			
10	a.	Express z parameters in terms of h – parameters.	**10**	**L3**	**CO5**
	b.	For the network shown, find Z and Y parameters.  Fig. Q. 10(b)	**10**	**L3**	**CO5**

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