CBCS SCHEME

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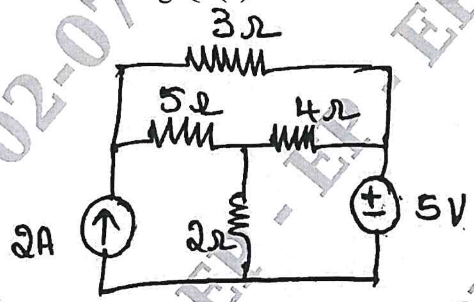
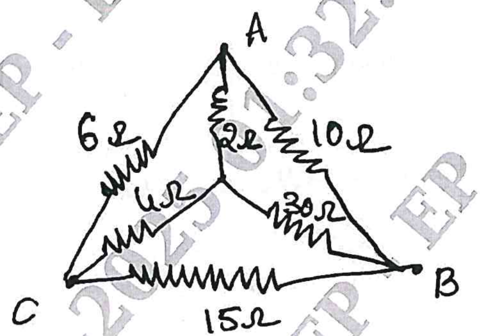
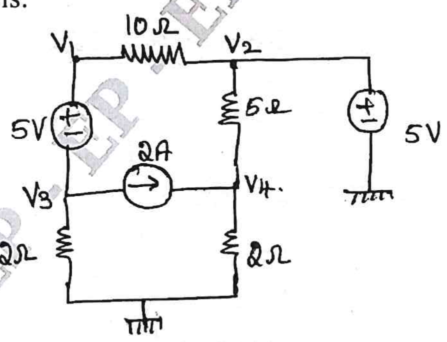
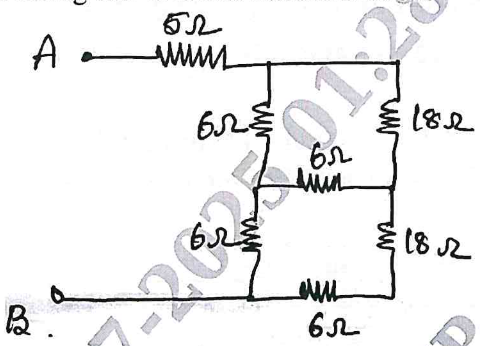
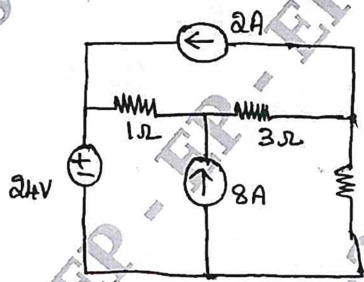
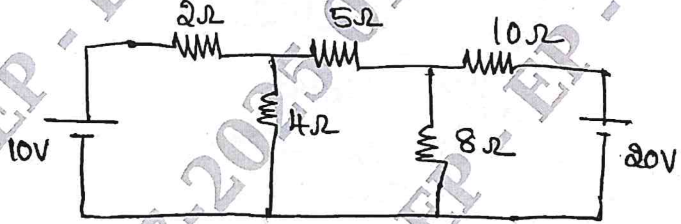
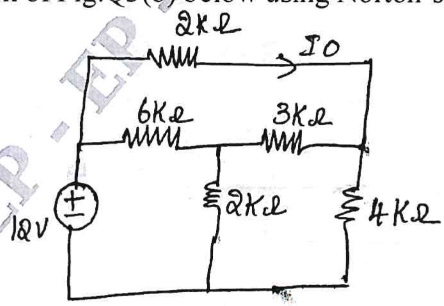
BEC304

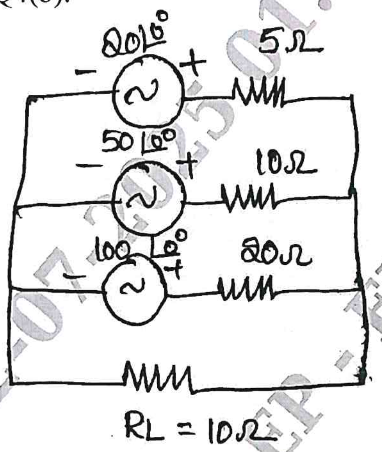
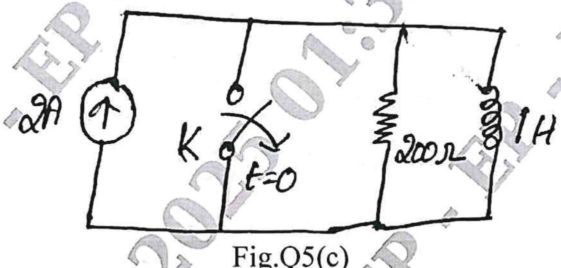
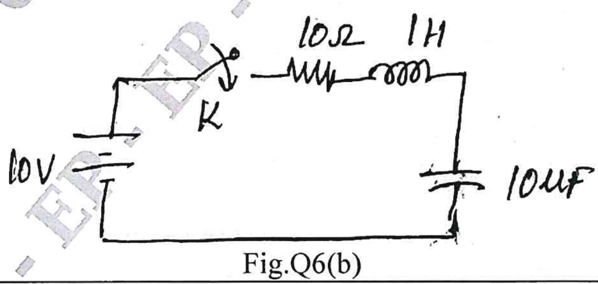
Third Semester B.E/B.Tech. Degree Examination, June/July 2025
Networks Analysis

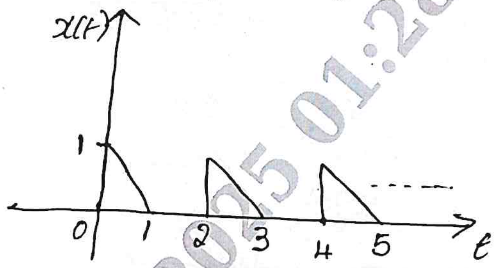
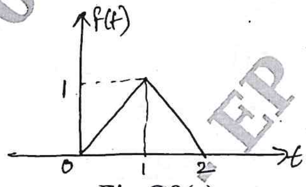
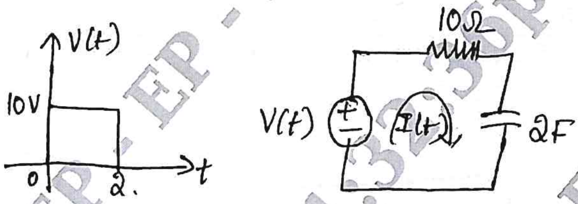
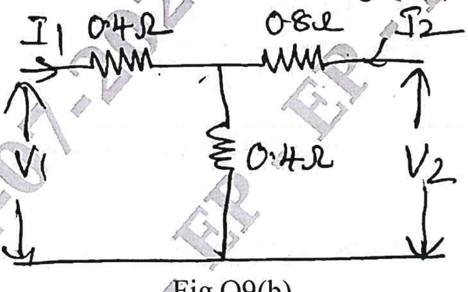
Time: 3 hrs. Max. Marks:100

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.	Using source transformation and source shifting techniques, find voltage across 2Ω resistor as shown in Fig.Q1(a).  Fig.Q1(a)	7	L3	CO1
	b.	For the circuit shown in Fig.Q1(b), determine the equivalent resistance between A and B.  Fig.Q1(b)	6	L3	CO1
	c.	For the network shown in Fig.Q1(c), compute all node voltages V_1, V_2, V_3 and V_4 using node analysis.  Fig.Q1(c)	7	L3	CO1

		OR			
2	a.	Determine the equivalent resistance between terminal A and B, in the network shown in Fig.Q2(a). Using star to Delta transformation.  Fig.Q2(a)	7	L3	CO1
	b.	In the circuit shown in Fig.Q2(b), use the loop analysis to find the power delivered to the 4 Ω resistor.  Fig.Q2(b)	7	L3	CO1
	c.	Using node voltage analysis, find the current in the each branch for the circuit shown in Fig.Q2(c).  Fig.Q2(c)	6	L3	CO1
		Module – 2			
3	a.	State the explain Theveninls theorem.	8	L2	CO2
	b.	Find I_0 in the network of Fig.Q3(b) below using Norton's theorem.  Fig.Q3(b)	12	L3	CO2

		OR			
4	a.	State and explain maximum power transfer when load impedance consisting of variable resistance and variable reactance.	**8**	**L2**	**CO2**
	b.	Using Millman's theorem, find the current flowing through $R_L = 10\Omega$ of the circuit as shown in Fig.Q4(b).  Fig.Q4(b)	**12**	**L3**	**CO2**
		Module – 3			
5	a.	Explain the initial and final conditions in basic elements.	**6**	**L2**	**CO3**
	b.	Obtain the expression for transient response i(t) of series R – C circuit when excited by DC supply.	**6**	**L2**	**CO3**
	c.	In the networks Fig.Q5(c), the switch K is opened at t = 0. At $t = 0^+$, solve for V, $\frac{dV}{dt}$ and $\frac{d^2V}{dt^2}$.  Fig.Q5(c)	**8**	**L3**	**CO3**
		OR			
6	a.	Obtain the expression for transient response, i(t) of series RL circuit when excited by AC supply.	**6**	**L2**	**CO3**
	b.	For the circuit shown in Fig.Q6(b), $V_C(0) = 0$. Find $i(0^+)$, $\frac{di}{dt}(0^+)$ and $\frac{d^2i}{dt^2}(0^+)$.  Fig.Q6(b)	**8**	**L3**	**CO3**
	c.	Explain initial and final conditions in RLC parallel circuit and RLC series circuit.	**6**	**L2**	**CO3**

		Module – 4			
7	a.	State and prove initial and final value theorem.	10	L3	CO3
	b.	Find the Laplace transformer of the periodic signal x(t) as shown in Fig.Q7(b).  Fig.Q7(b)	10	L3	CO3
		OR			
8	a.	Find the Laplace transformer of f(t) shown in Fig.Q8(a).  Fig.Q8(a)	10	L3	CO3
	b.	A voltage pulse of 10V and 2 sec duration is applied to the RC network shown in Fig.Q8(b). Find the current i(t).  Fig.Q8(b)	10	L3	CO3
		Module – 5			
9	a.	Derive Y-parameters interms of Z-parameters.	4	L2	CO4
	b.	Determine h-parameters of the circuit shown in Fig.Q9(b).  Fig.Q9(b)	8	L3	CO4
	c.	Prove the following expression in series resonance. $f_r = \sqrt{f_1 f_2}$.	8	L2	CO4
		OR			
10	a.	Obtain an expression for resonance frequency in a parallel resonant circuit.	4	L2	CO4
	b.	Define ABCD parameters and obtain ABCD parameters interms of h-parameters.	8	L3	CO4
	c.	A series RLC circuit has R = 50 Ω, L = 0.2H and C = 10 μF with an applied voltage of 20V. Determine : i) F_0 ii) Q_0 iii) BW.	8	L3	CO4

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