CBCS SCHEME

USN | | | | | | | | | | 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).	7	L3	CO1

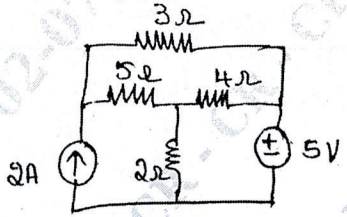

Fig.Q1(a)

	b.	For the circuit shown in Fig.Q1(b), determine the equivalent resistance between A and B.	6	L3	CO1

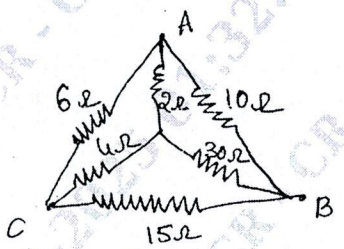

Fig.Q1(b)

	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.	7	L3	CO1

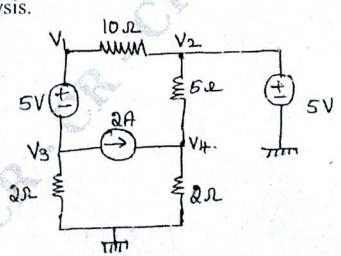

Fig.Q1(c)

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.	7	L3	CO1

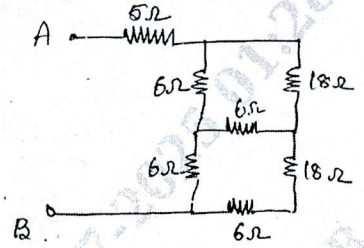

Fig.Q2(a)

	b.	In the circuit shown in Fig.Q2(b), use the loop analysis to find the power delivered to the 4 Ω resistor.	7	L3	CO1

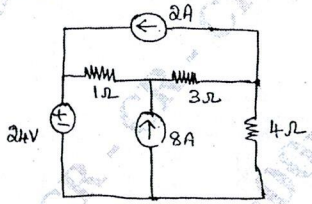

Fig.Q2(b)

	c.	Using node voltage analysis, find the current in the each branch for the circuit shown in Fig.Q2(c).	6	L3	CO1

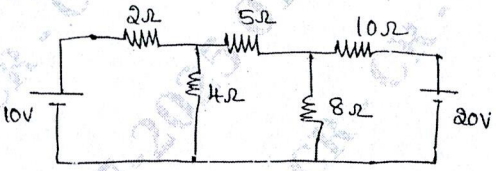

Fig.Q2(c)

Module – 2

3	a.	State the explain Thevenins theorem.	8	L2	CO2
	b.	Find I_0 in the network of Fig.Q3(b) below using Norton's theorem.	12	L3	CO2

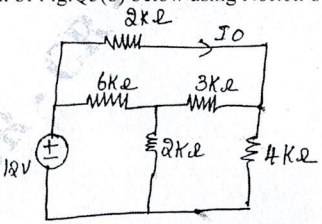

Fig.Q3(b)

		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).	12	L3	CO2

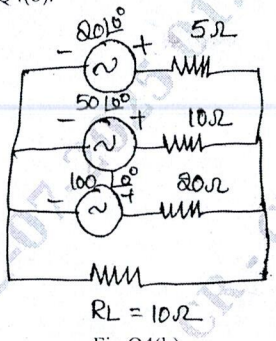

Fig.Q4(b)

		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 $\frac{d^2V}{dt^2}$.	8	L3	CO3

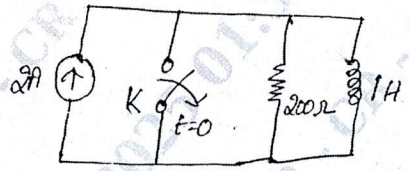

Fig.Q5(c)

		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), $V_C(o) = 0$. Find $i(0^+)$, $\frac{di}{dt}(0^+)$ and $\frac{d^2i}{dt^2}(0^+)$.	8	L3	CO3

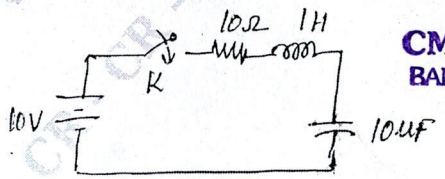

Fig.Q6(b)

	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).	10	L3	CO3

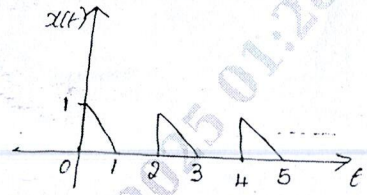

Fig.Q7(b)

		OR			
8	a.	Find the Laplace transformer of f(t) shown in Fig.Q8(a).	10	L3	CO3

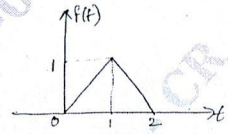

Fig.Q8(a)

	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).	10	L3	CO3

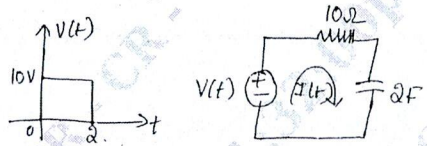

Fig.Q8(b)

		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).	8	L3	CO4

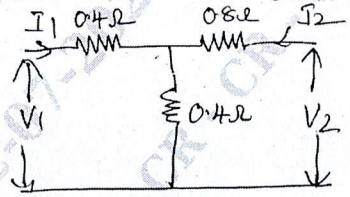

Fig.Q9(b)

	c.	Prove the following expression in series resonance. $fr = \sqrt{f_1 f_2}$.	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

* * * * *