CBCS SCHEME - Make-Up Exam

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

BEC304

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

Network 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

Q.1 a. Use source transformation to convert the circuit in Fig.Q1(a) to a single current source in parallel with a single resistor. — 05 | L2, L3 | CO1

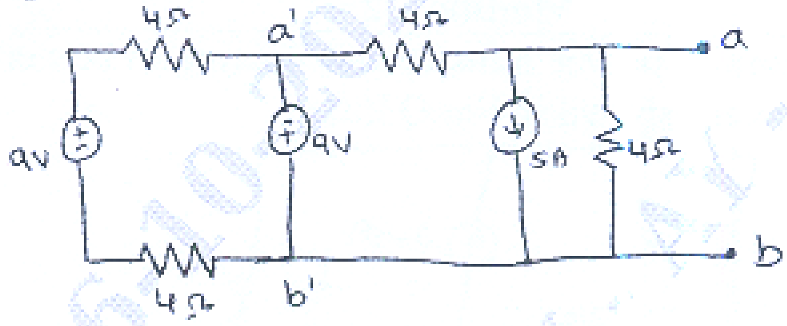


Fig.Q1(a)

b. Find the currents in various branches in the circuit shown in Fig.Q1(b) using mesh current analysis. — 10 | L2, L3 | CO1

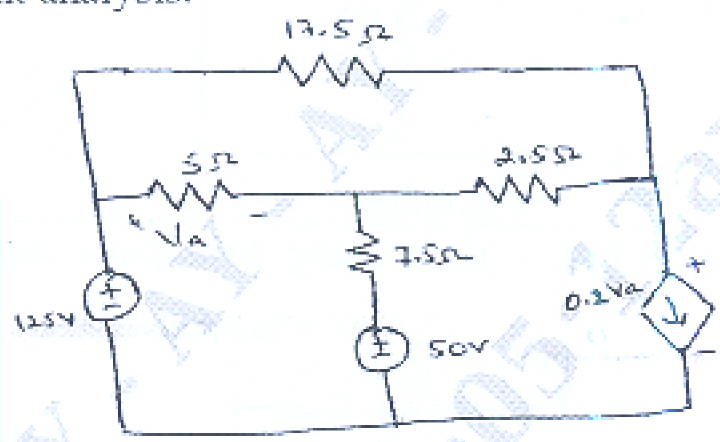


Fig.Q1(b)

c. Use nodal analysis to find V_0 in the circuit Fig.Q1(c). — 05 | L2, L3 | CO1

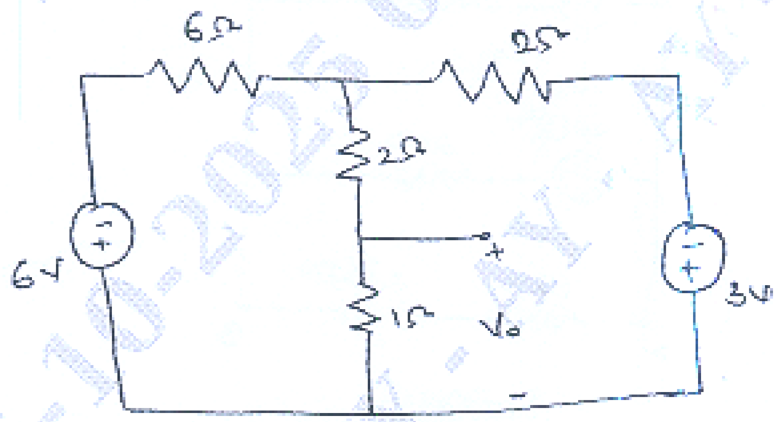


Fig.Q1(c)

OR

Q.2 a. Refer the circuit shown in Fig.Q2(a). Find the power dissipated in the 70 Ω register. — 10 | L2, L3 | CO1

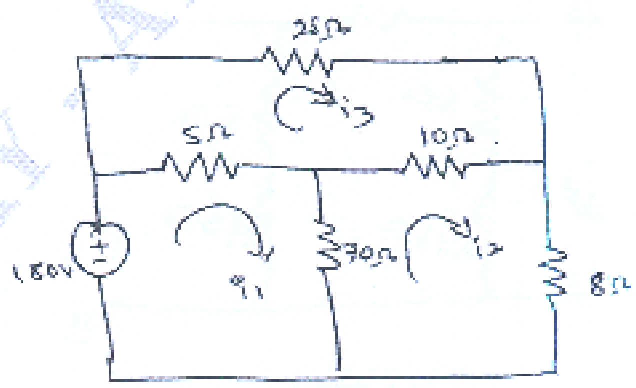
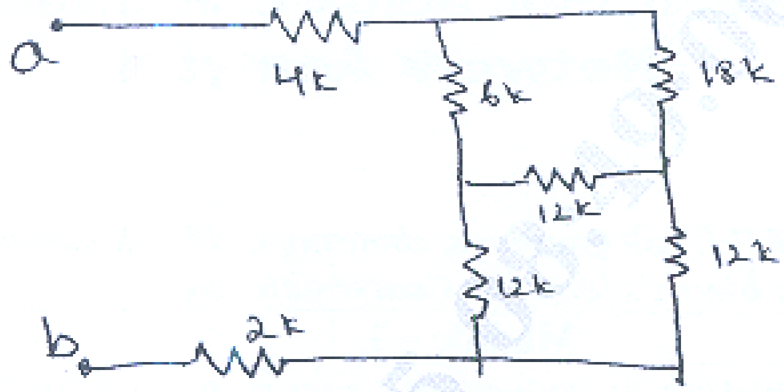
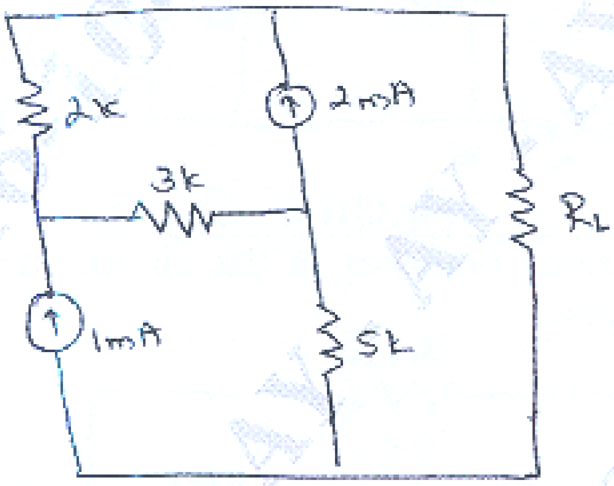
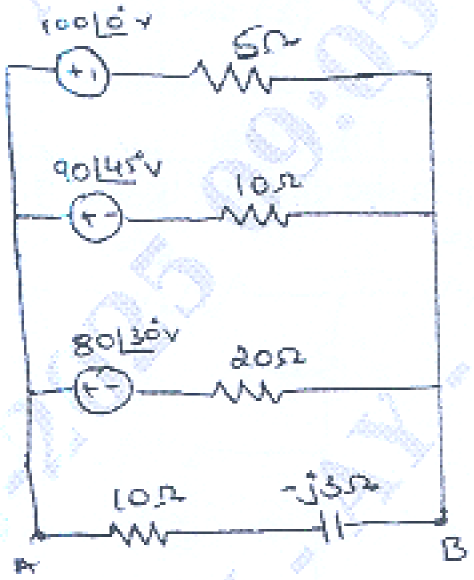
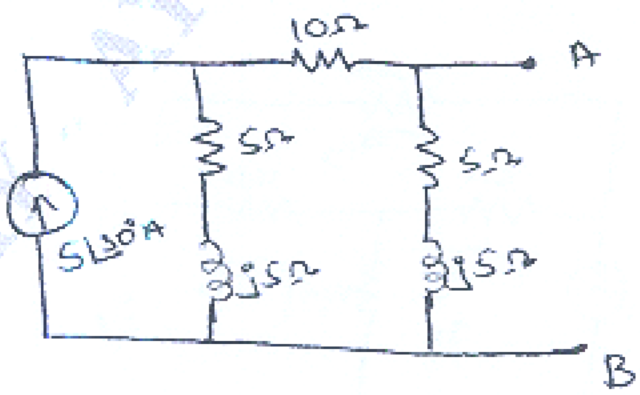


Fig.Q2(a)

	b.	Find the value of resistance between the terminals a – b of the network shown in Fig.Q2(b).  Fig.Q2(b)	10	L2 L3	CO1
		Module – 2			
Q.3	a.	Find the R_L for maximum power transfer and maximum power that can be transferred in the network shown in Fig.Q3(a).  Fig.Q3(a)	10	L2 L3	CO2
	b.	Find the current through $(10 - j3)\Omega$ using Millman's theorem. [Refer Fig.Q3(b)]  Fig.Q3(b)	10	L2 L3	CO2
		OR			
Q.4	a.	Obtain Thevenin's and Norton's equivalent circuit at the terminals AB for the network shown in Fig.Q4(a).  Fig.Q4(a)	10	L2 L3	CO2

b. Find the value of R_L in the network shown in Fig.Q4(b) that will achieve max power transfer and determine the value of the maximum power. — 10 — L2 L3 — CO2

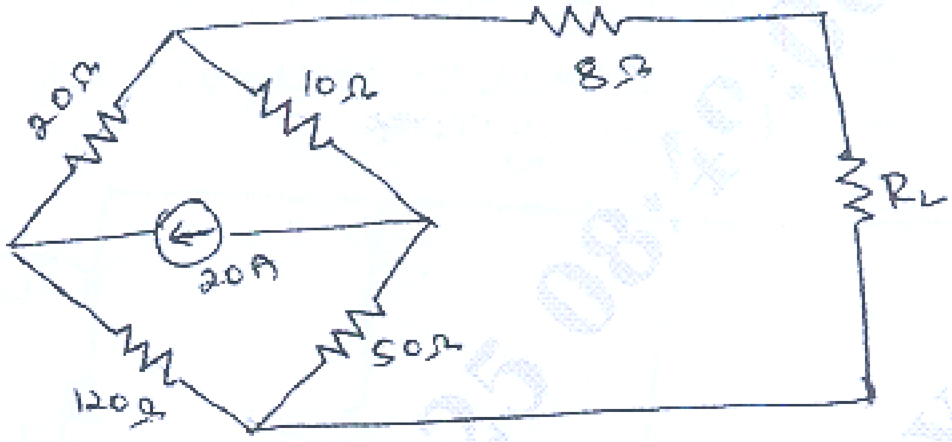


Fig.Q4(b)

Module – 3

Q.5 a. In the network of Fig.Q5(a) the switch is moved from position (1) to position (2) at t = 0. The steady state having reached before switching. Calculate i, $\frac{di}{dt}$, $\frac{d^2i}{dt^2}$ at $t = 0^+$ — 10 — L2 L3 — CO2

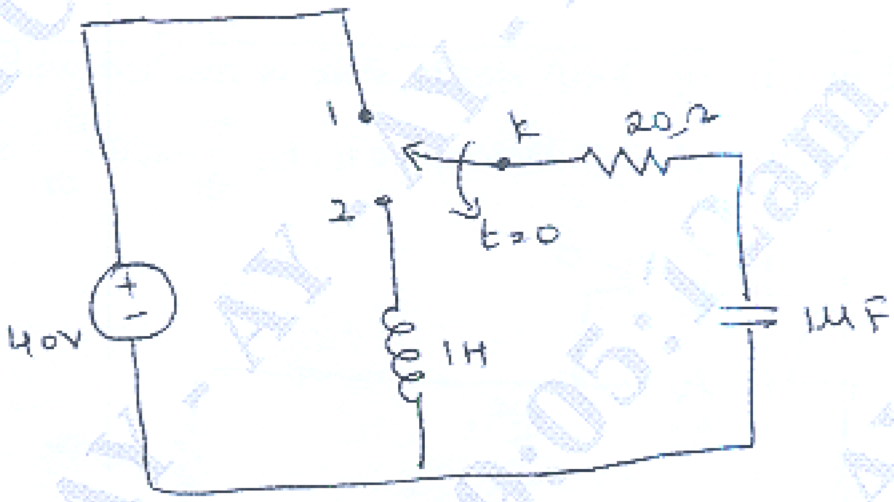


Fig.Q5(a)

b. For the circuit shown in Fig.Q5(b) steady state is reached with switch K open. At t = 0, the switch is closed. Determine the values of $V_a(0\;)$ and $V_a(0^-)$. — 10 — L2 L3 — CO2

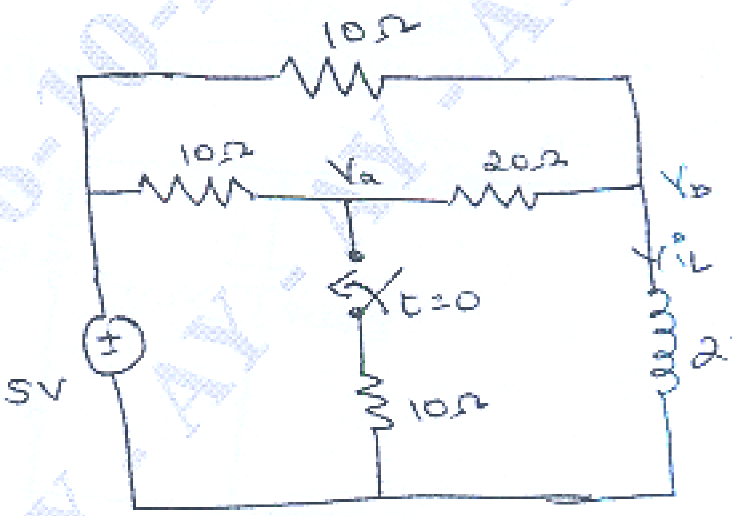


Fig.Q5(b)

OR

Q.6 a. In the given network Fig.Q6(a), the switch K is opened at $t = 0^+$, solve for the values of V, $\frac{dv}{dt}$ and $\frac{d^2v}{dt^2}$ if I = 2A, R = 200 Ω and L = 1 H. — 10 | L2, L3 | CO2

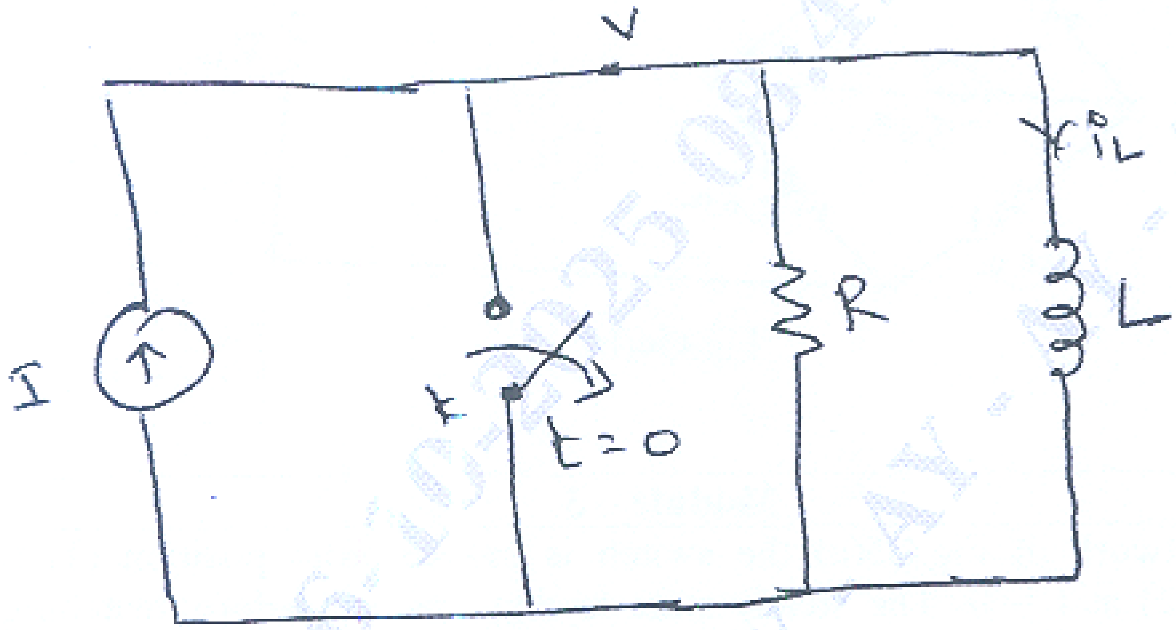


Fig.Q6(a)

b. In the circuit shown in Fig.Q6(b) steady state is reached with switch K open, the switch is closed at t = 0. Determine i_1, i_2, $\frac{di_1}{dt}$ and $\frac{di_2}{dt}$ at $t = 0^+$. — 10 | L2, L3 | CO2

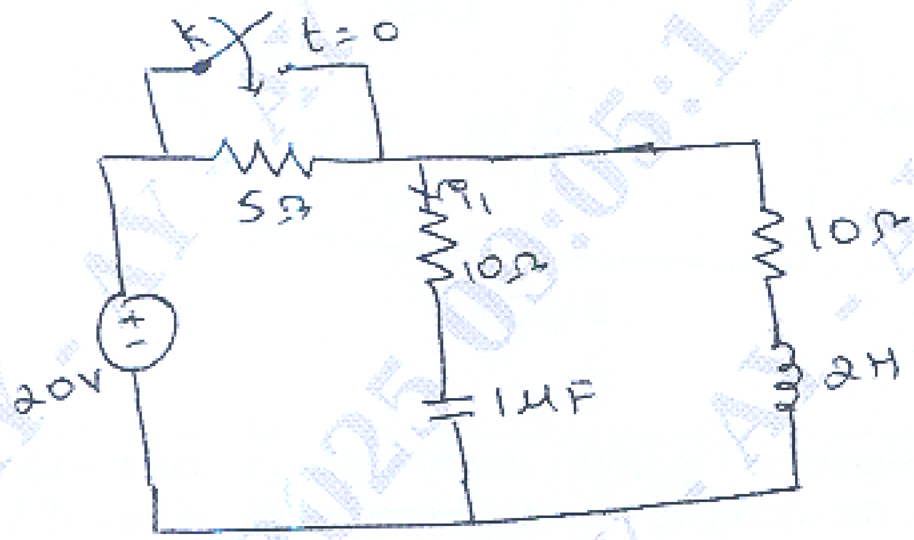


Fig.Q6(b)

Module – 4

Q.7 a. Determine the current $i_L(t)$ for $t \geq 0$ for the circuit shown in Fig.Q7(a). — 10 | L2, L3 | CO3

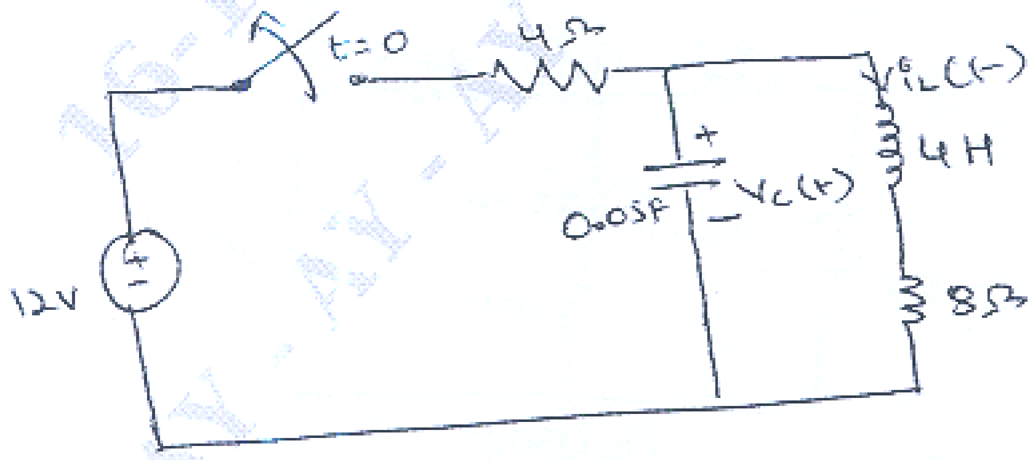
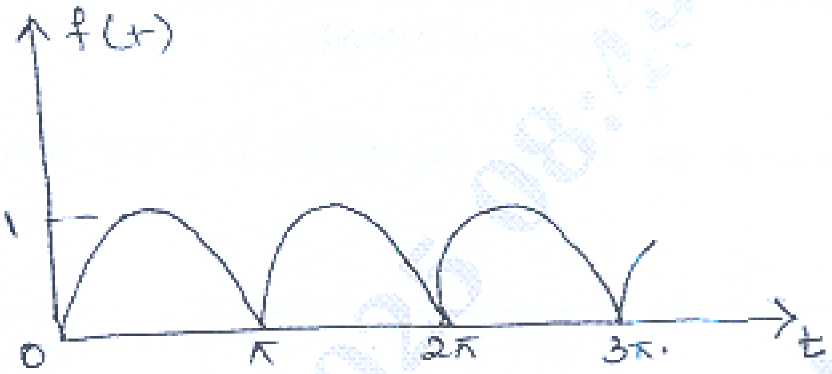
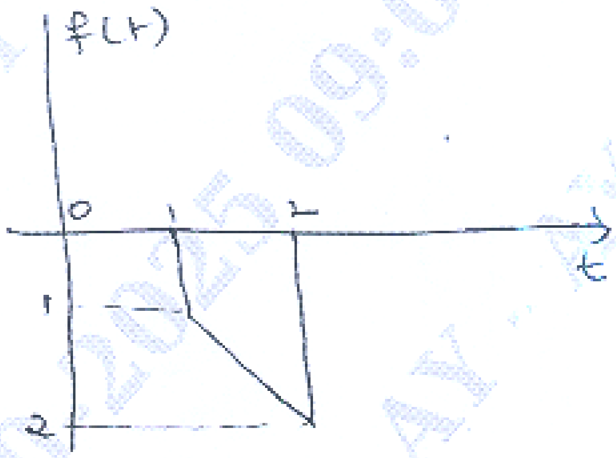
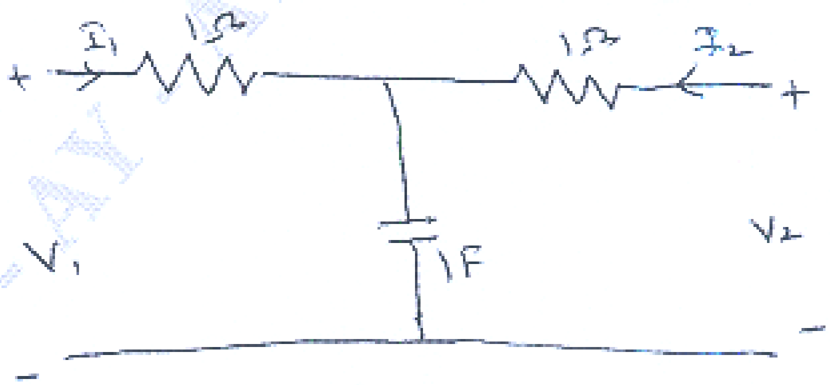
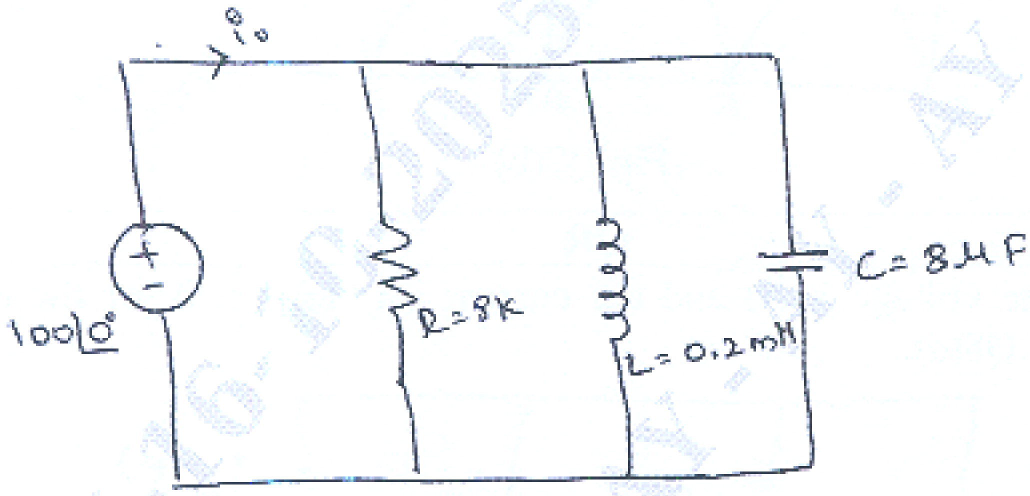


Fig.Q7(a)

	b.	Refer the waveform shown in Fig.Q7(b). The equation for the waveform is sin t from 0 to π, – sin t from π to 2π. Show the Laplace transform of this waveform is $F(s)=\frac{1}{s^2+1}\coth\left(\frac{\pi s}{2}\right)$  Fig.Q7(b)	10	L2 L3	CO3
		OR			
Q.8	a.	Determine the voltage $V_c(t)$ and the current $i_c(t)$ for $t \geq 0$ for the circuit shown in Fig.Q8(a).  Fig.Q8(a)	10	L2 L3	CO3
	b.	Express the function shown in Fig.Q8(b) using singularity function and then find F(s).  Fig.Q8(b)	10	L2 L3	CO3
		Module – 5			
Q.9	a.	Obtain Y parameters in terms of Z parameters and h-parameters.	10	L2 L3	CO4
	b.	Determine the transmission parameters for the circuit shown in Fig.Q9(b).  Fig.Q9(b)	10	L2 L3	CO4

		OR			
Q.10	a.	Derive an expression of Bandwidth, half power frequencies and quality factor of a series resonance circuit.	10	L1 L2	CO5
	b.	For the circuit shown in Fig.Q10(b) find the following : i) ω_0, Q, B ii) ω_1 and ω_2 iii) The max power dissipated at ω_0, ωc_1 and ωc_2 (resonate freq and cutoff freq.)  Fig.Q10(b)	10	L2 L3	CO5

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