Hall Ticket Number:

1	6	0	2	2	2	7	8	4	0	2	8

Code No. : 13366 N/O

VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD

Accredited by NAAC with A++ Grade

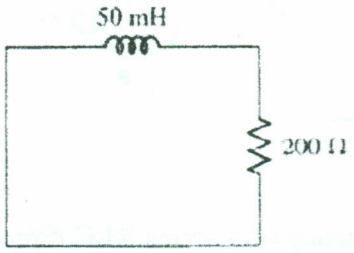
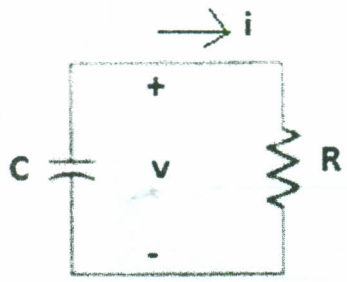
B.E. (E.E.E.) III-Semester Main & Backlog Examinations, Jan./Feb.-2024

Electrical Network Analysis

Time: **3 hours** Max. Marks: **60**

*Note: Answer all questions from **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	Distinguish between transient state response and steady state response.	2	1	1	1,2
2.	Determine the time constant of the network shown in figure. 	2	2	1	1,2
3.	Draw the step response of source free RLC series network.	2	1	2	1,2
4.	Give a practical example for a second order system.	2	2	2	1,2
5.	What are the properties of ideal transformer?	2	1	3	1,2
6.	For a series RLC Circuit R=2Ω, L=1mH and C=0.4 μF, Determine the Band width of the circuit.	2	2	3	1.2
7.	Write the condition for reciprocity of a two port network in terms of A,B,C and D Parameters.	2	1	4	1,2
8.	For a two port network admittance matrix is given by $\begin{bmatrix} 1 & 3 \\ 4 & 1 \end{bmatrix}$. Determine the value of Z_{22}.	2	2	4	1,2
9.	Define zero of a transfer function.	2	1	5	1,2
10.	State initial theorem and final value theorem.	2	1	5	1,2
	Part-B (5 × 8 = 40 Marks)				
11. a)	For the source free RC network shown in figure 1, derive the voltage across capacitor v(t) for t > 0. Assume that the initial voltage across capacitor is v(0)= V_0.  Figure 1	4	2	1	1,2

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b)	Define singularity functions and give examples.	4	1	1	1,2
12. a)	Classify the response across capacitor of series RLC circuit based on the roots of characteristic equation.	4	2	2	1,2
b)	For the circuit shown in figure 2, the switch is open for a long time but closed at t=0. Determine a) $i(0^+)$ b)$v(0^+)$ c)$di(0^+)/dt$ and $dv(0^+)/dt$	4	3	2	1,2

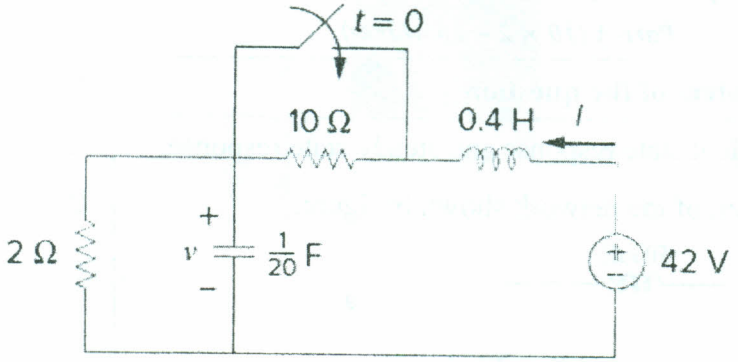

Figure 2

13. a)	Derive the expression for resonant frequency of a series RLC circuit and prove that resonant frequency ω_0 is the geometric mean of two half power frequenciesω_1 and ω_2.	4	2	3	1,2
b)	Calculate the phasor currents I_1 and I_2 in the circuit shown in Figure 3.	4	3	3	1,2

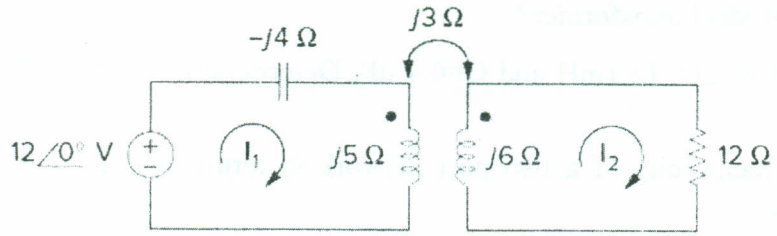

Figure 3

14. a)	Prove that Impedance parameters of a two port network, formed by the series connection of two two-port networks is the sum of the z parameters for the individual networks.	4	2	4	1,2
b)	Find the transmission parameters for the two-port network shown in Figure 4.	4	3	4	1,2

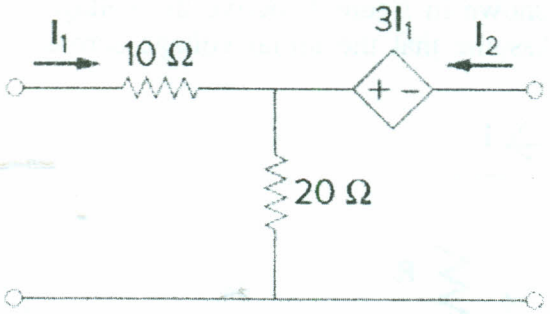

Figure 4

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15. a)	State and explain convolution theorem.	4	2	5	1,2
b)	Apply Laplace's transform technique to determine the value of the voltage across the capacitor shown in figure 5 assuming that the value of $v_s(t)$ = 10u(t) V and assume that at t = 0, −1 A flows through the inductor and +5 V is across the capacitor.	4	3	5	1,2

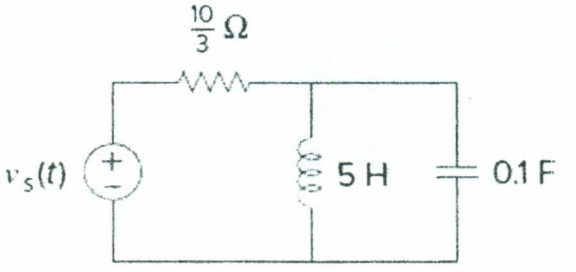

Figure 5

16. a)	Explain the complete response of a series RL network subjected to Step response.	4	2	1	1,2
b)	For a source free parallel RLC circuit, assuming that initial voltage across capacitor is v(0) = 5 V, initial current through the inductor i(0) = 0, L = 1 H, C = 10 mF and R = 6.25 Ω. Find v(t) (voltage across capacitor) for t > 0.	4	3	2	1,2
17.	Answer any ***two*** of the following:				
a)	Define Duality and write at least four dual pairs of Electrical Networks.	4	1	3	1,2
b)	Find the y parameters of the two-port network shown in Figure 6.	4	3	4	1,2

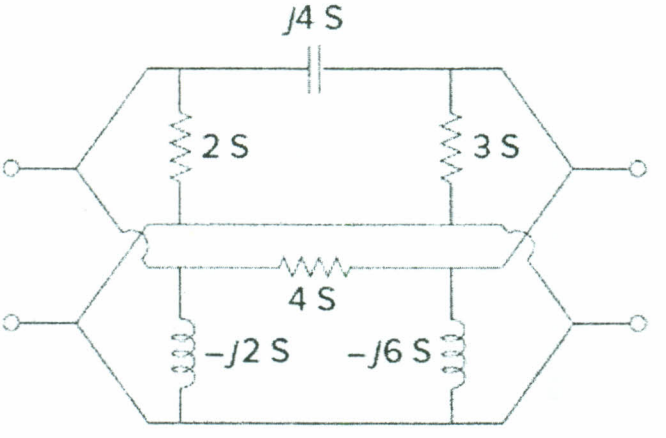

Figure 6

c)	Write and explain any four properties of Laplace's Transforms.	4	2	5	1,2

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	23.75%
ii)	Blooms Taxonomy Level – 2	33.75%
iii)	Blooms Taxonomy Level – 3 & 4	42.5%

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