Hall Ticket Number:

Code No. : 13469 O

VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD

Accredited by NAAC with A++ Grade

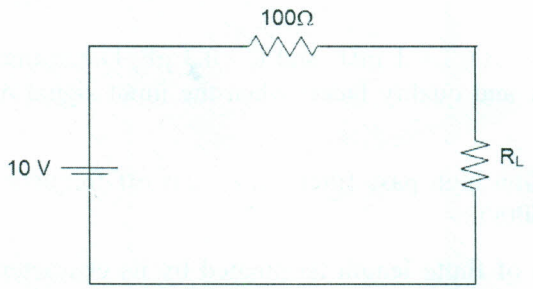
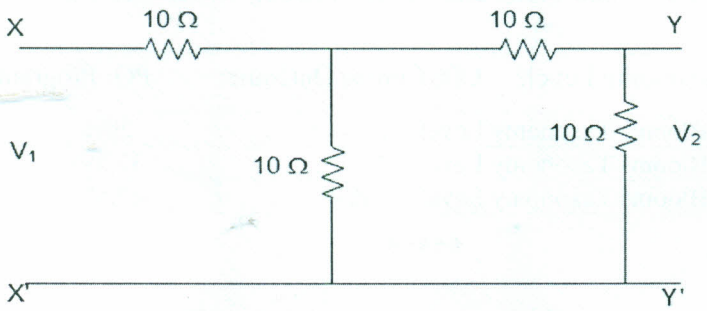
B.E. (E.C.E.) III-Semester Backlog Examinations, Jan./Feb.-2024

Network Analysis and Transmission Lines

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.	State the Tellegen's theorem and give its significance	2	1	1	1
2.	Find the maximum power to the load that can be transferred from the source voltage for the circuit given below 	2	3	1	2
3.	What is the significance of initial and final conditions in the circuit analysis	2	1	2	1
4.	Differentiate between Zero Input Response (ZIR) and Zero State Response (ZSR)	2	2	2	1
5.	Describe the resonance and give the differences between series and parallel resonant circuits.	2	1	3	1
6.	What are the advantages of m-derived filters over constant K-filters	2	1	4	1
7.	Define wavelength and velocity of propagation in a transmission line	2	1	5	1
8.	Determine the series impedance and shunt admittance of a transmission line characterized by R=10Ω/km, L=0.0037H/km, C=0.0083X10^{-6} F/km and G=0.4X10^{-6} ℧/km at 1000Hz.	2	3	5	2
9.	Give the significance and applications of Smith Chart	2	1	6	1
10.	Calculate the characteristic impedance of a quarter wave transmission line to match 25 ohm load to the 50 ohm line	2	3	6	1
	Part-B (5×8 = 40 Marks)				
11. a)	Describe reciprocity theorem and derive the condition for reciprocity of a two port network	4	2	1	1
b)	Estimate the hybrid parameters h_{11}, h_{21} for the circuit given below 	4	3	1	2

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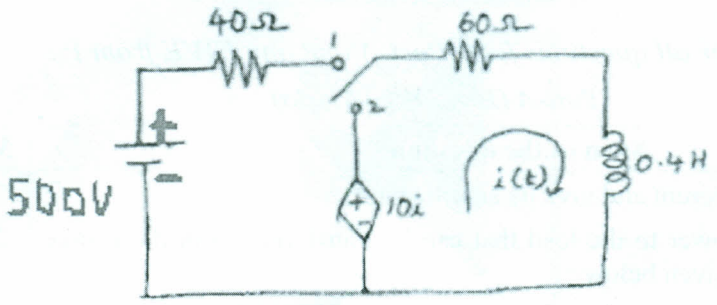
12.	a)	What is meant by time constant? Evaluate the time constant of an RL circuit.	4	2	2	1
	b)	For the network shown in Figure, Find the current *i(t),* when the switch is changed from position 1 to 2 at t=0. 	4	3	2	2
13.	a)	A series resonant circuit has R=2Ω, L= 1 mH and C= 0.3 μF, Determine the bandwidth, resonant frequency and quality factor when the input signal of 20 sin ωt is applied.	4	3	3	2
	b)	Design a constant K, T- section high pass filter with a cut off frequency of 10KHz, design impedance of 600Ω	4	3	4	2
14.	a)	Prove that a transmission line of finite length terminated by its characteristic impedance is equivalent to an infinite line.	4	2	5	4
	b)	The Characteristic Impedance of a uniform transmission line is 2039.6 Ω at a frequency of 800Hz. At this frequency the propagation constant was found to be $0.054\angle 87.9^0\,\Omega$. Determine the values of primary constants.	4	3	5	2
15.	a)	Estimate the input impedance of λ/2,λ/4, λ/8 lines and illustrate their relevance	4	2	6	1
	b)	Define Reflection coefficient (Γ) and voltage standing wave ratio (VSWR) and give the minimum and maximum value of reflection coefficient and VSWR	4	2	5	1
16.	a)	Explain impedance parameters and admittance parameters of a two port network	4	2	1	1
	b)	Differentiate between transient analysis and steady state analysis	4	2	2	1
17.		Answer any ***two*** of the following:				
	a)	Draw the block diagram of composite filter and explain each block	4	1	4	1
	b)	Analyze the reasons for different types of distortions in a transmission line and give the distortion less condition for transmission.	4	4	5	1
	c)	Calculate standing wave ratio and reflection coefficient on a line having the characteristic impedance Z_o= 300 ohms and the terminating impedance Z_R is 300+j400 ohms	4	3	5	2

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

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	37.5%
iii)	Blooms Taxonomy Level – 3 & 4	42.5%

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