Hall Ticket Number:

Code No. : 13447 S

VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD

Accredited by NAAC with A++ Grade

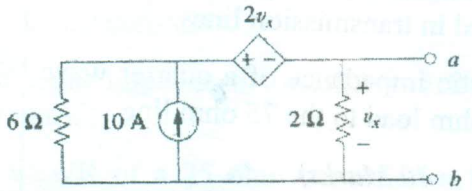
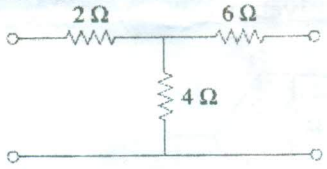
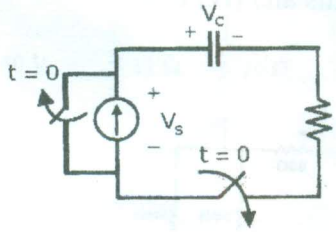
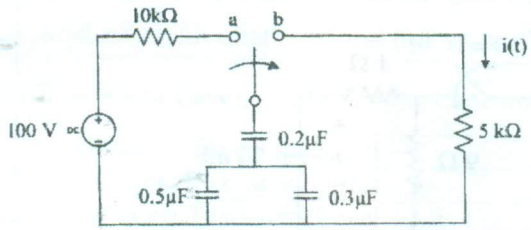
B.E. (E.C.E.) III-Semester Supplementary Examinations, August-2022

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.	Find the Norton equivalent circuit of the circuit in figure shown below at terminals a-b. 	2	2	1	2
2.	Find the Y_{12} and Y_{21} parameters for the T network shown in below figure. 	2	1	1	1
3.	A combination of 1μF capacitor with an initial voltage $V_c(0)$ = −2V in series with a 100Ω resistor is connected to a 20 mA ideal dc current source by operating both switches at t = 0s as shown. Determine the current through resistor at t=0- and give the justification. 	2	1	2	1
4.	The switch in the circuit shown was on position 'a' for a long time, and is moved to position b at time t = 0. Find the current i(t) for t=0$^-$ and t = ∞ 	2	2	2	2

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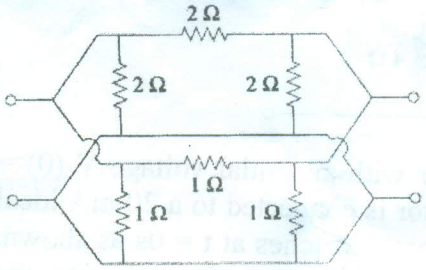
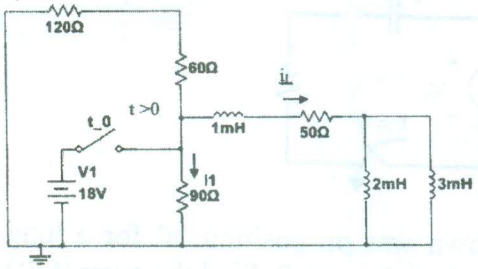
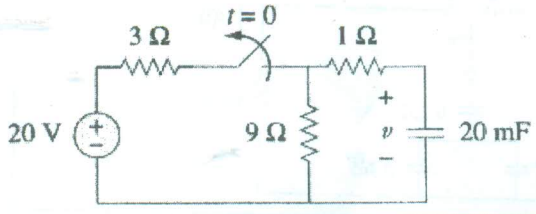
5.	What is meant by resonance? Differentiate between series and parallel resonance circuits.	2	2	3	1
6.	Calculate the cut off frequency of a constant K-low pass filter given L= 50mH and C= 0.2μF.	2	2	4	2
7.	Define wavelength and velocity of propagation in a transmission line	2	1	5	1
8.	Determine the 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} Ʊ/km at 1000Hz.	2	1	5	2
9.	Outline the significance of impedance matching and list various impedance matching devices used in transmission lines.	2	2	6	1
10.	What is the value of characteristic impedance of a quarter wave transmission line to match 120 ohm load to the 75 ohm line	2	2	6	2
	Part-B (5×8 = 40 Marks)				
11. a)	Define Transmission model parameters and derive the condition for reciprocity of a network	4	1	1	1
b)	Find the h parameters of the network given below.	4	2	1	2
					
12. a)	Determine both i_1 and i_L in the circuit shown in below figure for t >0 and at (i) t=0$^-$ (ii) t=0$^+$ (iii) t=1ms and (iv) t=∞	4	3	2	3
					
b)	Find v(t) for $t \geq 0$. Calculate the initial energy stored in the capacitor.	4	3	2	3
					

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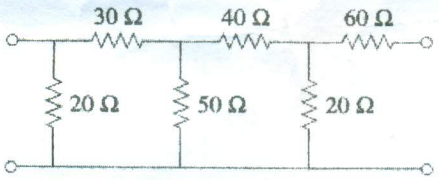
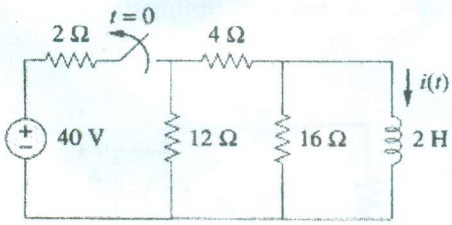
13. a)	A series resonant circuit has R=2Ω, L= 1 mH and C= 0.3 μF, Determine the bandwidth, resonant frequency and quality factor when the input signal of 20 sin ωt is applied.	4	3	3	2
b)	Design both the T- section and π-section m-derived high pass filter with a cut off frequency of 20KHz, design impedance of 400Ω and m=0.2.	4	3	4	3
14. a)	Explain the types of distortions in a transmission line and derive the distortion less condition for transmission.	4	4	5	1
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)	Determine the input impedance for λ/2,λ/4, λ/8 lines and brief their characteristics.	4	4	5	1
b)	Compute the VSWR of a 75 ohm transmission line when it is terminated by a load impedance of 50+j30 ohm.	4	3	5	3
16. a)	Find the transmission parameters of the circuit shown below. 	4	2	1	2
b)	The switch in the circuit of figure shown below has been closed for a long time. At t = 0, the switch is opened. Calculate i(t) and V_L at t =1ms. 	4	3	2	2
17.	Answer any ***two*** of the following:				
a)	Describe the composite filter design and list out the advantages over m-derived filters.	4	1	4	1
b)	Prove that a transmission line of finite length terminated by its characteristic impedance is equivalent to an infinite line.	4	4	5	1
c)	Outline the concept of smith chart and list out its applications.	4	2	6	1

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

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	30%
iii)	Blooms Taxonomy Level – 3 & 4	50%

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