R22 Regulation *Subject code: 4E3DC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech III Semester Supplementary Examinations, July 2024

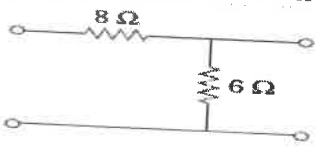
NETWORK THEORY

(*ELECTRONICS & COMMUNICATION ENGINEERING*)

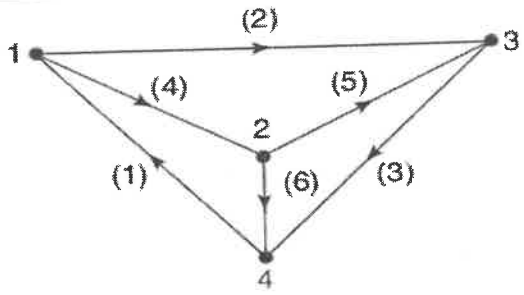
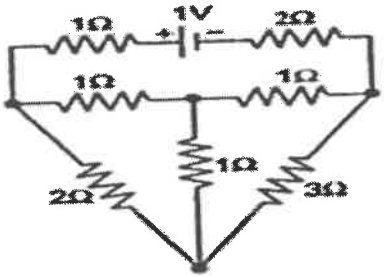
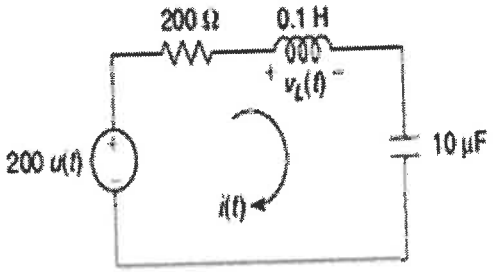
Maximum Marks: 60

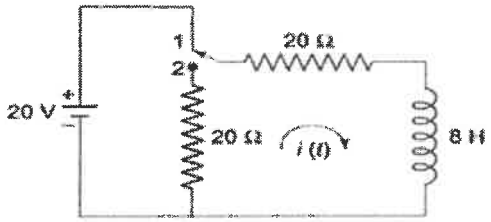
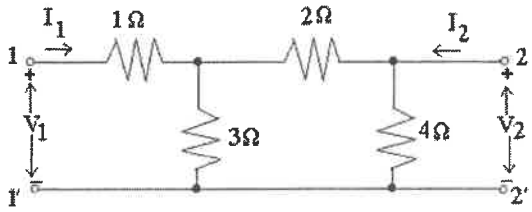
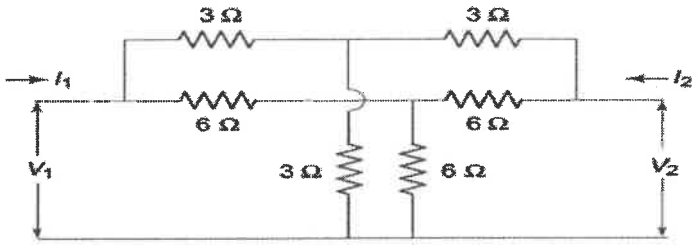
Date:23.07.2024 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

	Part-A	CO	Bloom Tx
All the following questions carry equal marks (10X1M=10 Marks)			
1.a)	Define a connected graph.	CO1	2
b)	Define tree of an electric network with example.	CO1	2
c)	Write down the few applications of RL, RC, RLC circuits.	CO1	1
d)	What is meant by transient response?	CO1	1
e)	List two conditions that a time-domain function must satisfy for its Laplace Transform to exist.	CO2	2
f)	Distinguish between Laplace transform and Inverse Laplace transform	CO2	2
g)	Find the Z Parameters For The Two Port Network In Fig.1  Figure.1	CO3	2
h)	Provide one example of how two-port networks are used in telecommunications systems.	CO3	1
i)	Define the Q-factor of a filter.	CO4	2
j)	Why impedance matching is important in filter design.	CO4	2

	Part-B		Bloom Tx level
Answer All the following questions. (5X10M=50Marks)			
2	The graph of a network is shown in Fig. Write the a) Tieset matrix, b) Cutset matrix. Consider branches (4), (5) and (6) as tree branches. [10]	C01	3

	 Figure		
	OR		
3	Find the dual network of the network shown in figure. [10]  Figure.	CO1 CO1	2 2
4	Determine whether RLC series circuit shown in Figure.is under damped, overdamped, or critically damped. Also, find $V_L(0+)$, di/dt at 0+ and i(∞) [10]  Figure.	CO1	3
	OR		
5	a) Derive the expression for voltage across capacitance of a parallel R -C excited with a sinusoidal current source at t=0. [5] b) Simple RL series circuit excited by a sinusoidal source. The circuit is initially relaxed At t=0 the switch is closed. Find the response i(t) for the circuit. [5]	CO1	4
6	Find the inverse Laplace transform of the function. [10] F(s) = (3s + 2)/(s^2 + 4s + 5)	CO2	3
	OR		

7	In the circuit shown in figure. the switch is moved from 1 to 2 at time t = 0. The steady-state current having previously established in the R-L circuit, find the expression for the current i(t) after switching using Laplace transform method. [10]  Figure.	CO2	4
8	Calculate the transmission parameters of the network shown below Figure. Also verify the Reciprocity & symmetricity of the network. [10]  Figure .	CO3	3
	OR		
9	Obtain the Y parameters for the circuit shown below figure. [10]  Figure	CO3	3
10	a) Enlist limitation of passive filters. [5] b) Design a m–derived high pass filter with a cut – off frequency of 10KHz; design impedance of 5Ω and m=0.4. [5]	CO4	4
	OR		
11	a) What is the purpose of using filters in electronic circuits, and how do they contribute to signal processing. [5] b) Discuss the characteristics and frequency response of a single-tuned filter. [5]	CO4	2