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University Institute of Engineering & Technology

(Recognised Under Section 2(f) and 12B of UGC)

Kurukshetra University, Kurukshetra

Roll No. -

THEORY EXAMINATION – DECEMBER 2017	
B.TECH - ECE	SEMESTER - III

TIME – 3 Hrs.

M.M. - 75

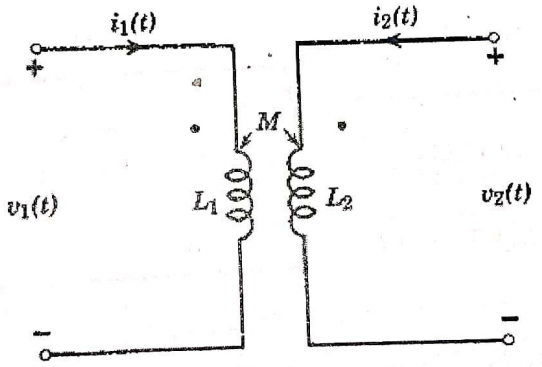
COURSE NO. - ECE-205

COURSE TITLE - NETWORK ANALYSIS & SYNTHESIS

Note: All questions in Part-A and Part-B are compulsory. Attempt any four questions from Part-C selecting at least one from each unit.

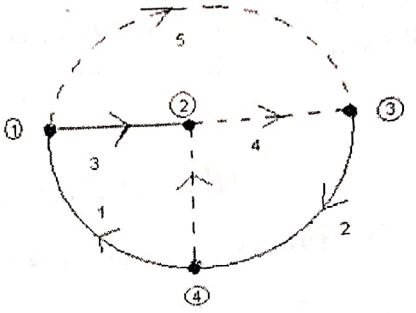
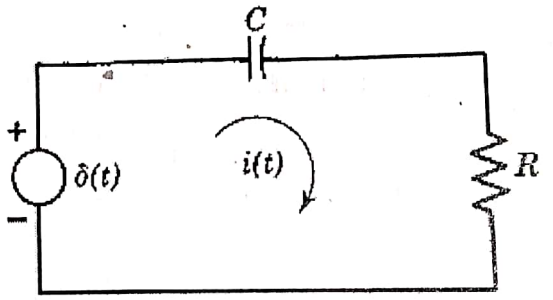
PART-A (15 Marks)

Q.No.-1. Answer the following questions carrying one mark each. **15**

(i).	What is incidence matrix?
(ii).	Define the concept of network analysis.
(iii).	In the circuit of Fig.1., draw the Laplace equivalent circuit.  Fig.1.
(iv).	Define the transient response of a circuit.
(v).	Define poles and zeros of a function.
(vi).	Explain the difference between driving point function and transfer function.
(vii).	List four different parameters of two port networks.
(viii).	Write the condition of symmetry of a network in terms of h-parameters.
(ix).	Show [Y] parameters in terms of [Z] parameters.
(x).	What are the specifications of m-derived Filters?
(xi).	A constant k high pass pi section has a characteristic impedance of 300 Ω at f = ∞. At f = fc, the characteristic impedance will be_____.
(xii).	An m derived low pass filter has fc = 1000 Hz and m = 0.4. This filter will have infinite attenuation at f_∞=_____Hz.
(xiii).	Discuss the demerits of constant-k filters?

(xiv).	Define positive real functions.	
(xv).	Differentiate Foster Form and Cauer Form.	

PART B (20 Marks)

	UNIT-I	**5**
2	For the tree shown in Fig.2, develop the fundamental cut-set matrix.  Fig.2.	
	UNIT-II	**5**
3	For the circuit shown in Fig.3, find impulse response of the current i(t) using Laplace Transform.  Fig.3	
	UNIT-III	
4	Determine the [Z] parameters of a two-port network whose Y parameters are $[Y] = \begin{bmatrix} 10 & 4 \\ 4 & 10 \end{bmatrix} \Omega$	**5**
	UNIT-IV	
5	Define and explain positive real functions with its various properties.	**5**

PART-C (40 Marks)

	UNIT-I	
6	Derive and explain the Step Response of parallel RLC circuit.	**10**
7	For the circuit shown in Fig.4, find $i_1(0+)$, $i_2(0+)$ and $i_1(\infty)$.	**1**

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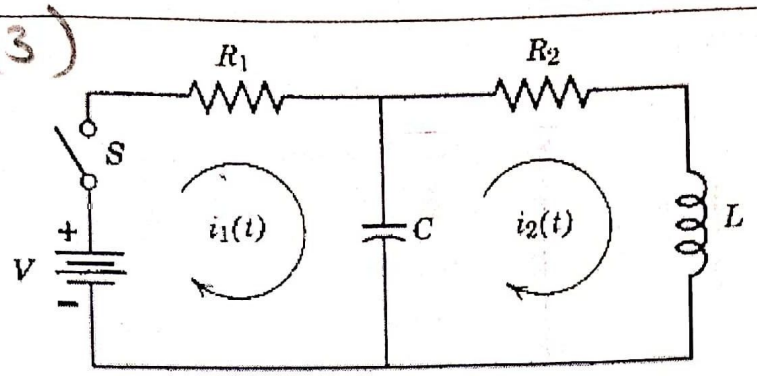

Fig.4.

UNIT-II

8	For the circuit shown in Fig.5, the switch is thrown from position 1 to 2 at t=0. Just before the switch is thrown, the initial conditions are $i_L(0-) = 2A$ and $v_C(0-) = 2V$. Find the current $i_1(t)$ after the switching action using Laplace Transform.	10

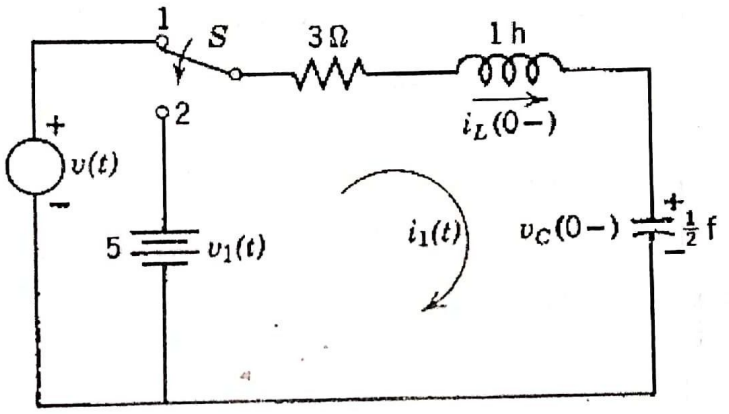

Fig.5.

9	Describe various restrictions on pole and zero locations for transfer functions.	10

UNIT-III

10	Determine the ABCD parameters for the two-port shown in Fig. 6.	10

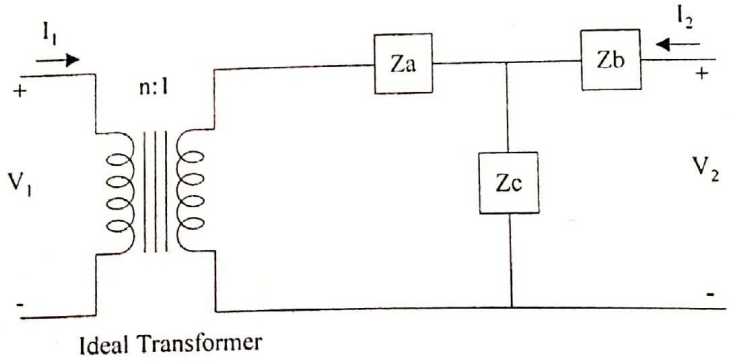

Fig.6.

11	Determine the Z parameters for the two-port shown in Fig. 7.	10

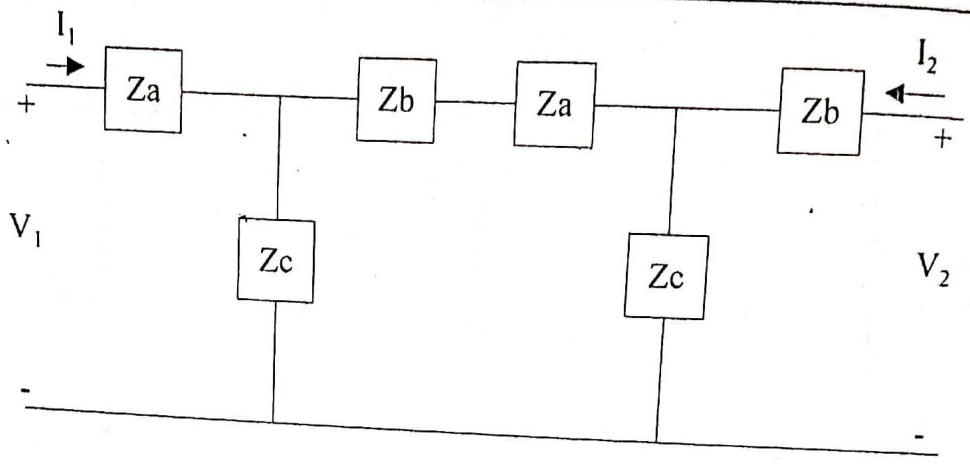

Fig. 7.

UNIT-IV

12	Design m-derived π-section LPF for R_0= 600 ohms, f_c= 1800 Hz and f_∞ = 2000Hz.	**10**
13	An impedance is given by $$Z(s) = \frac{2s^5 + 12s^3 + 16s}{s^4 + 4s^2 + 3}$$ Realize the network in Cauer-I form.	**10**