University Institute of Engineering & Technology

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

Kurukshetra University, Kurukshetra

Roll No.-.....

THEORY EXAMINATION – DECEMBER 2018 TIME- 3 HRS

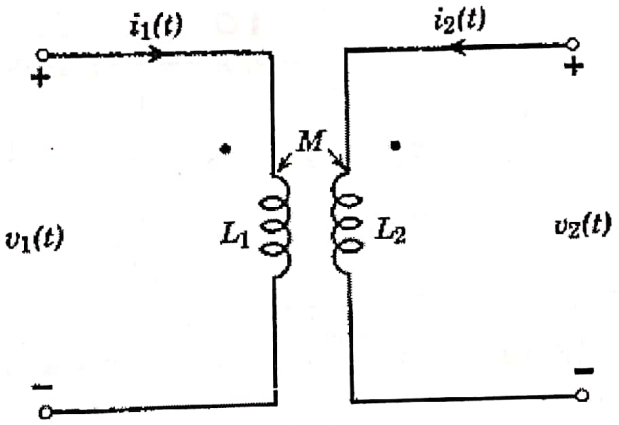
B. Tech (Electronics & Communication Engineering) 3rd Semester M.M. -75

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 fundamental tie-set matrix?
(ii).	Define singularity functions.
(iii).	In the circuit of Fig.1.,write the voltage equations in time domain using KVL.  Fig.1.
(iv).	Define the transient response of a circuit.
(v).	How poles and zeros of a function are shown on s-plane?
(vi).	Explain the difference between driving point function and transfer function.
(vii).	For parallel connection of two port networks, which parameters are added?
(viii).	Write the condition of reciprocity of a network in terms of Z-parameters.
(ix).	Show [Z] parameters in terms of [Y] parameters.
(x).	What are the specifications of constant-kfilters?
(xi).	A constant k high pass T-section has a characteristic impedance of 600 Ω at f = ∞. At f = fc, the characteristic impedance will be_____.
(xii).	An m-derived high pass filter has fc = 4000 Hz and m = 0.436. This filter will have infinite attenuation at f_∞=_____Hz.
(xiii).	Discuss the merits of m-derived filters?
(xiv).	Define positive real functions.
(xv).	Differentiate Foster-I and Foster-II Forms.

PART B (20 Marks)

	UNIT-I	**5**
2	For the tree shown in Fig.2, develop the fundamental cut-set matrix.	

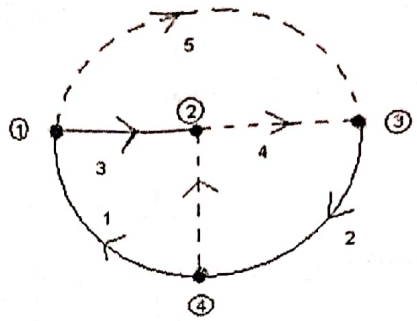


Fig.2.

	UNIT-II	**5**
3	For the circuit shown in Fig.3, find $v_o(t)$ using Laplace Transform assuming zero initial conditions.	

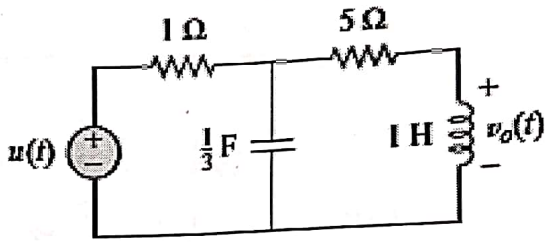


Fig.3

	UNIT-III	**5**
4	Determine the [Z] parameters of a two-port network whose transmission parameters are $$[T]=\begin{bmatrix} 10 & 1.5\Omega \\ 2S & 4 \end{bmatrix}$$	
	UNIT-IV	
5	Define and explain synthesis of one port network with RC elements with its various properties.	**5**

PART-C (40 Marks)

	UNIT-I	
6	Derive and explain the Step Response of series RLC circuit.	**10**
7	Having been in position a for a long time, the switch in the circuit shown in Fig.4 is moved to position b at t =0. Find $v(t)$ and $v_R(t)$ for t>0.	**10**

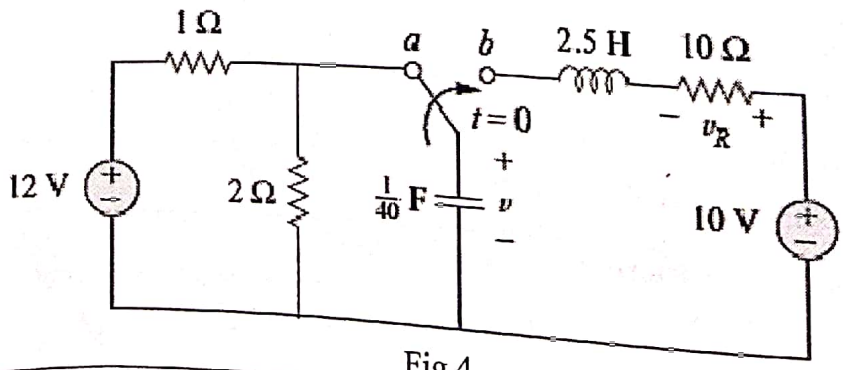


Fig.4.

	UNIT-II	
8	For the circuit shown in Fig.5, assume that there is no initial energy stored in the circuit at t=0 and i_s=10 u(t) A. Using Laplace Transform, calculate $v_o(t)$.	**10**

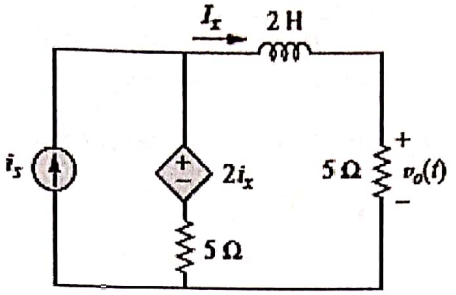


Fig.5.

9	Describe various restrictions on pole-zero locations for driving point functions.	**10**
	UNIT-III	
10	Calculate V_2/V_s for the two-port shown in Fig. 6.	**10**

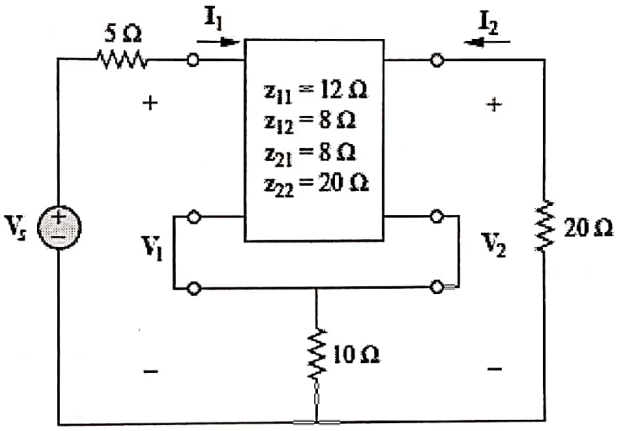


Fig.6.

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

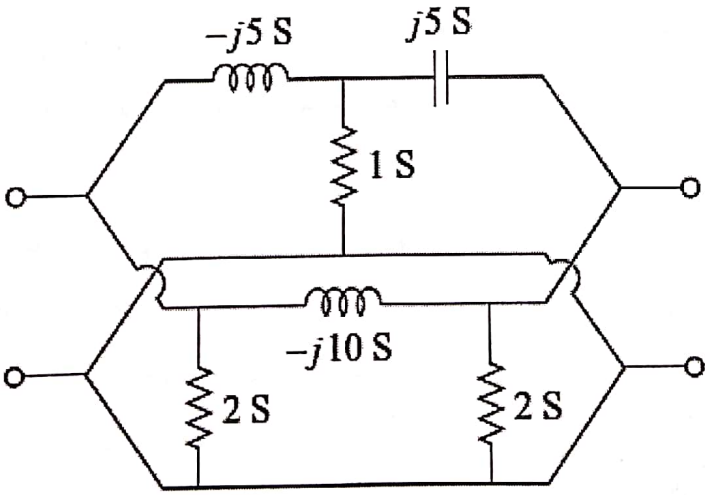


Fig. 7.

	UNIT-IV	
12	Design m-derived T-section HPF for R_0= 600 ohms, f_c= 4000 Hz and f_∞= 3600Hz.	**10**
13	An impedance is given by $$Z(s) = \frac{2s^5 + 12s^3 + 16s}{s^4 + 4s^2 + 3}$$ Realize the network in Foster-I form.	**10**