

SE Sem III B.M (Rev)

12/12/2014

SE (Bio Med) - Sem III - CBSGS - ENTS
12 DFC 2011

QP Code :14681

Sub: Electrical Network Analysis & Synthesis

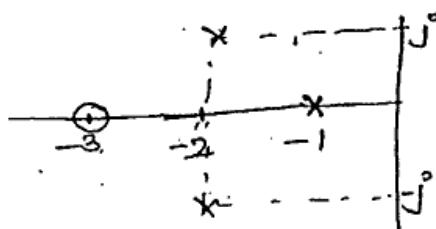
(19)

(3 Hours)

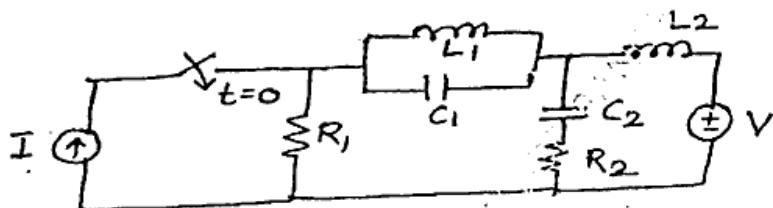
[Total Marks : 80]

- N.B. (1) Attempt any four questions out of six.
 (2) Assume any suitable data if required.
 (3) Figures to the right indicate full marks.

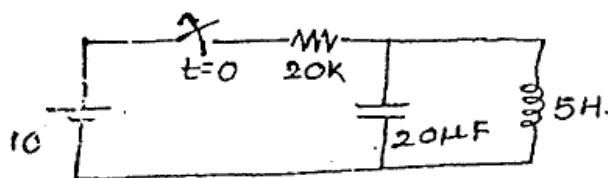
1. (a) Find system function for the given pole zero plot D.C. gain of the system is 10 5



- (b) Draw dual of the following— 5



- (c) For the given network s/w is closed and a steady state is reached. At $t = 0$ s/w is opened. Find $i_L(0^+)$, $V_C(0^+)$ & $\frac{di_L}{dt}(0^+)$ 5

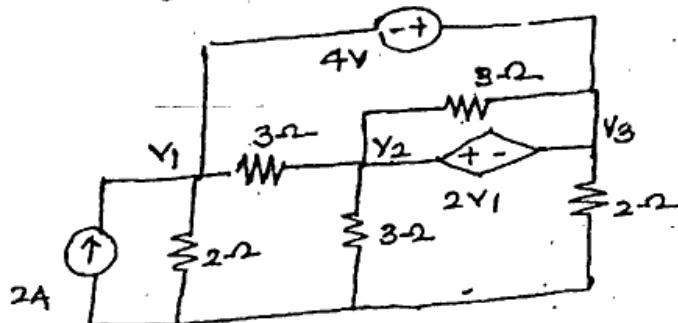


- (d) Check the following function for Hurwitz. 5
 $F(s) = 3s^4 + 5s^3 + 1$

GN-Con.:112

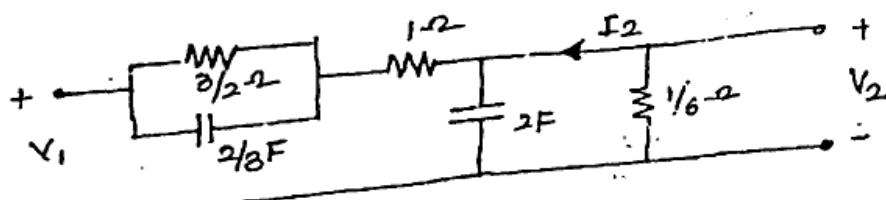
[TURN C]

2. (a) Find condition of reciprocity for Y-parameters.
 (b) Find nodal voltages for a given circuit.

10
10

3. (a) For the ladder n/w shown. Show that, $\frac{I_2(s)}{V_1(s)} = \frac{K(s+1)}{(s+2)(s+4)}$ and find value of K.

10

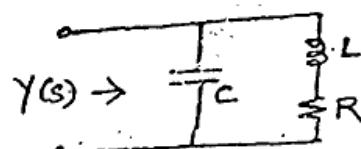


- (b) Explain significance of poles and zeros.

10

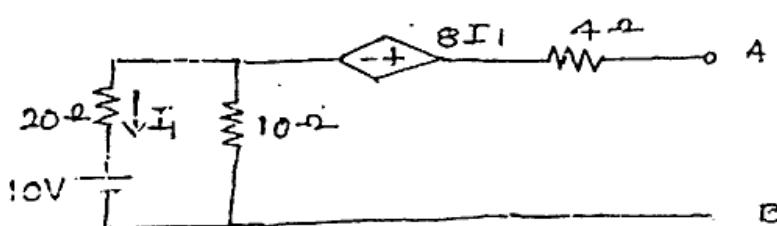
4. (a) Admittance function of a given network is given by $Y(s) = \frac{K(s-s_1)(s-s_2)}{(s-s_3)}$.
 (i) Express s_1 , s_2 & s_3 in terms of R, L, & C.
 (ii) If $s_1 = -10 + j10^4$ and $s_2 = -10 - j10^4$,
 Find R, L & C if $y(j0) = 10^{-1}$.

15



- (b) Find Thevenin's equivalent network between A & B.

5

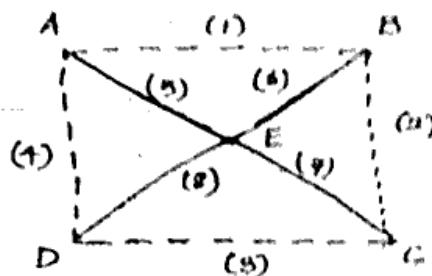


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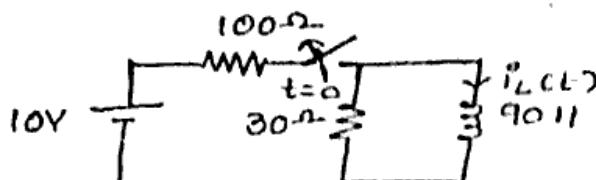
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5. (a) Obtain incidence matrix, t-set matrix and f-cutset matrix for the graph given. 12



- (b) For the network shown in Figure, steady state is reached with the switch closed. 8
The switch is opened at $t = 0$. Obtain expression for $i_L(t)$ for $t > 0$.



6. (a) Synthesize the following function in Foster I form 10

$$(i) Z(s) = \frac{2(s+1)(s+3)}{(s+2)(s+6)}$$

$$(ii) Z(s) = \frac{(s+1)(s+3)}{s(s+2)}$$

- (b) Synthesize the following functions in cauer II form. 10

$$(i) Y(s) = \frac{s^4 + 6s^2 + 4}{2s^3 + 4s}$$

$$(ii) Z(s) = \frac{36 + 40s^2 + 4s^4}{4s + s^3}$$