

Questions should be —

WRITTEN IN LEGIBLE HANDWRITING IN BLACK INK.

SIGNS, SKETCHES OR FIGURES IF ANY BE DRAWN IN NEAT BLACK INK,
so as to avoid mistakes in the printed question papers.

Duration03..... Hours.

Total Marks assigned to the paper ...80..

QP code. 24580

Q. No.

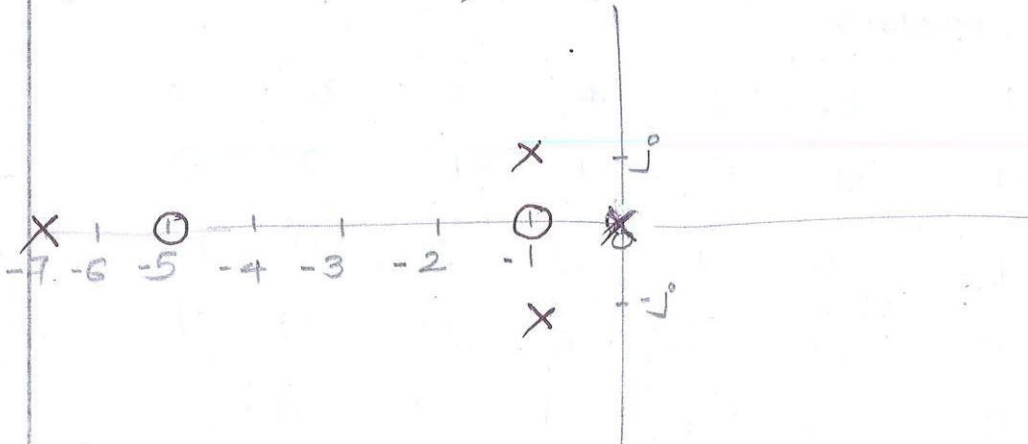
SOLUTION.

Marks

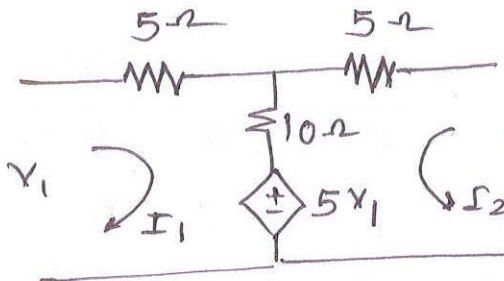
N.B.:

Sem III, SE Biomed.
Electrical Network Analysis & Synthesis
(CBSGS)

1 a) Not Hurwitz (quotient -ve)

b) $I_1 = -2$, $V_R = -28V$, $I_2 = 12A \therefore I = -12A$.c) zeros at $s = -1, -5$ poles at $s = 0, -1+j, -1-j, -7$ 

d)



$$V_1 - 5I_1 - 10(I_1 + I_2) - 5V_1 = 0$$

$$-4V_1 - 15I_1 - 10I_2 = 0$$

$$\therefore V_1 = -\frac{15}{4}I_1 - \frac{10}{4}I_2$$

$$V_2 - 5I_2 - 10(I_1 + I_2) - 5V_1 = 0$$

$$V_2 = 10I_1 - 15I_2 + 5\left(-\frac{15}{4}I_1 - \frac{10}{4}I_2\right)$$

$$= \left(10 - \frac{75}{4}\right)I_1 - \left(15 + \frac{50}{4}\right)I_2$$

$$V_2 = -\frac{35}{4}I_1 - \frac{110}{4}I_2$$

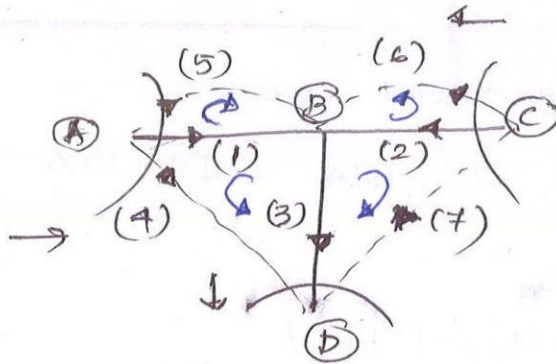
considering 2A

1.2 a) $V_1' = 6.66V$ $I_1' = 0.222A$

considering 50V.

$V_1'' = -40$ $I_1'' = 0.333$

$\therefore I_1 = 0.555$



i) incidence matrix

	1	2	3	4	5	6	7
A	-1	0	0	-1	-1	0	0
B	1	1	-1	0	0	0	0
C	0	-1	0	0	0	-1	-1
D	0	0	1	1	0	0	1

(ii) tie-set

	1	2	3	4	5	6	7
4	-1	0	-1	1	0	0	0
5	-1	0	0	0	-1	0	0
6	0	-1	0	0	0	1	0
7	0	-1	-1	0	0	0	1

I. No.	(iii) Cutset	1	2	3	4	5	6	7	Marks
	A	-1	0	0	-1	-1	0	0	
	C	0	-1	0	0	0	-1	-1	
	D	0	0	1	1	0	0	1	

3 a) $v(0^-) = 0, v(0^+) = 300 \text{ V}.$

$$\frac{dv}{dt}(0^+) = -9 \times 10^4 \text{ V/s} \quad \frac{d^2v}{dt^2}(0^+) = 27 \times 10^4 \text{ V/s}^2$$

b) $i(0^-) = 3 \text{ A}, i_L(0^-) = 1.5 \text{ A}, i_L(0^+) = 1.5 \text{ A}$
 $i(t) = -1.5 e^{-4t}$

a) $I_a = 12 \text{ A}, I_b = 8 \text{ A}, I_c = -10 \text{ A}.$

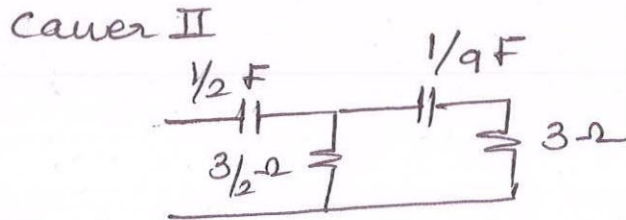
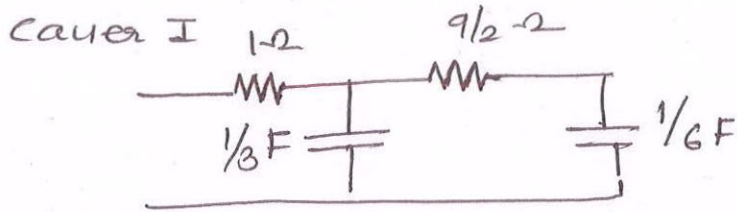
b) $Y_{12} = Y_{21} \quad Y_{11} = Y_{22}.$

5 a) $v_2/v_1 = -3/7.$

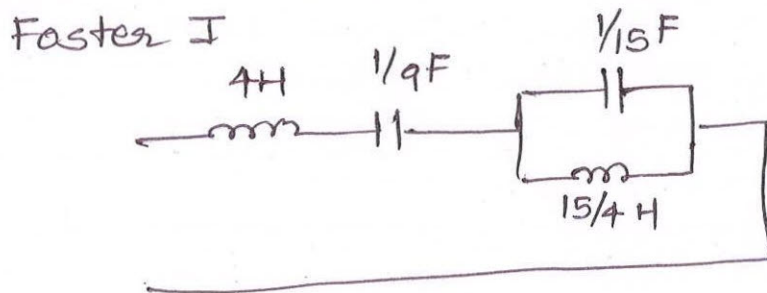
b) $z = \begin{bmatrix} 5 & 1 \\ -1 & 3 \end{bmatrix}$

Q. No.

6 a)



b)



Foster II

