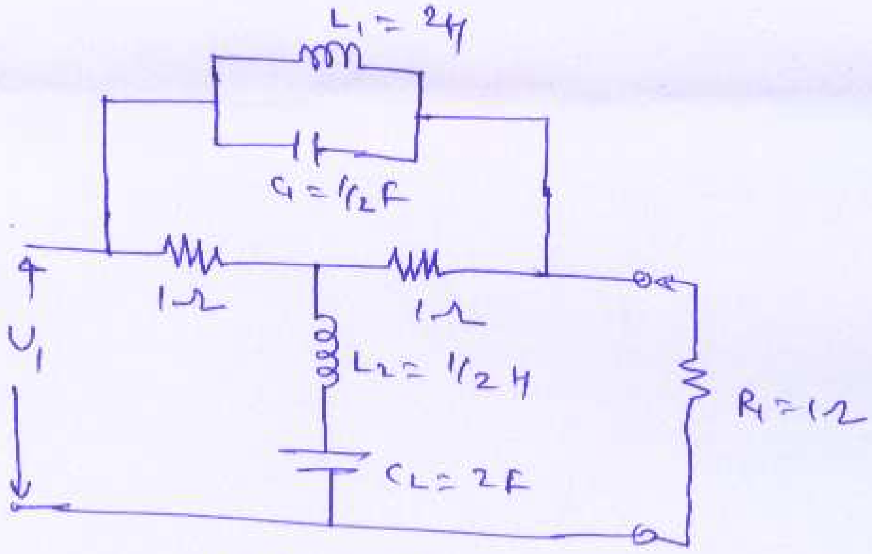
TE / In Sem - 135

Q 5 (b)

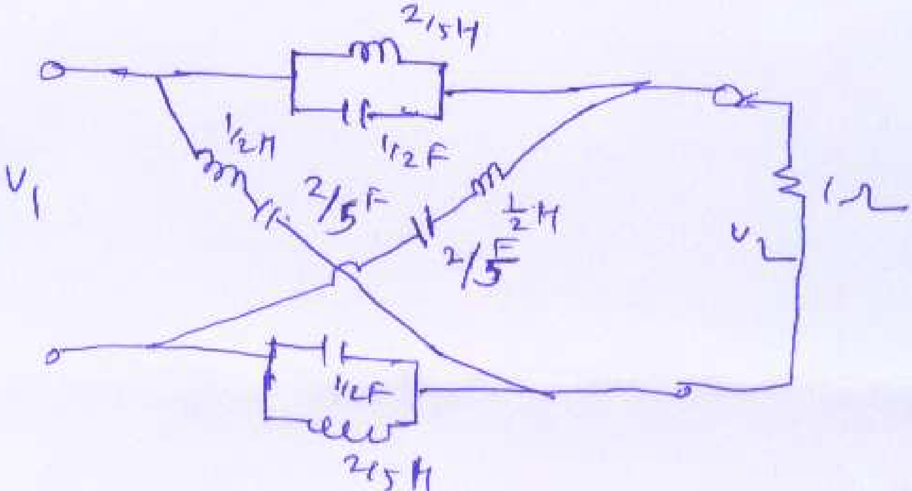
$$\frac{V_2}{V_1} = \frac{s^2+1}{s^2+2s+1}$$ (4M)



Realized Bridge 'T' N/w

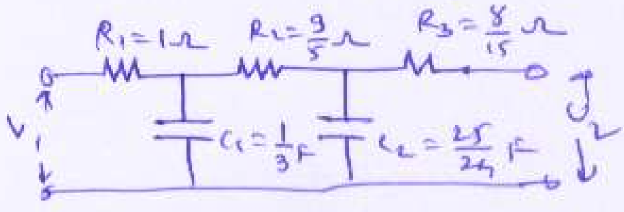
Q. 6 (a)

$$\frac{V_2}{V_1} = \frac{s^2-2s+5}{s^2+2s+5}$$ — (6M)



Q. 6 (b) $G_{21}(s) = \frac{1}{(s+2)(s+5)}$ $\therefore Z_{11}(s) = \frac{(s+2)(s+5)}{(s+1)(s+3)}$ for RC N/w.

— (1M)



} — (3M)

TE/Insem-135

TE (Electronics) (Sem-I)

Network synthesis (In sem)

(2012 Pattern)

(Solution / scheme of marking)

Q.1 (a)

for causal network and their condition — (2 M)

for stable network and their condition — (2 M)

Q1 (b) $P(s) = s^7 + 3s^5 + 2s^3 + s$

$P'(s) = 7s^6 + 15s^4 + 6s^2 + 1$

All the coefficients in quotient terms are positive and real
Hence the given polynomial is Hurwitz polynomial — (3 M)

Q1 (c) The range of K is ~~[illegible]~~ for the polynomial
$P(s) = s^3 + 4s^2 + 3s + K$ is

$\boxed{0 < K < 12}$ —— (3M)

OR

Q2 (a) i) for Removal operation of conjugate imaginary axis poles — (3 m)

ii) For Removal operation of constant from driving point impedance funn (3 m)

Q2 (b) $F(s) = \frac{3s^2+5}{s(s^2+1)} = \frac{k_1}{s} + \frac{k_2 s}{s^2+1} = \frac{5}{s} + \frac{(-2)s}{s^2+1}$

$k_1 = 5, \quad k_2 = -2$ (4m)

∵ Residue at a pole of $s = \pm j$ is negative ∴ The given function is not positive real funn.

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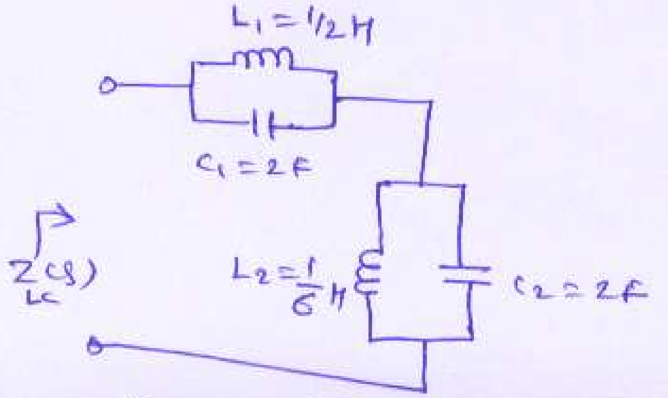
Q. 3(a) for each property : $\frac{1}{2}$ Mark (2 M)

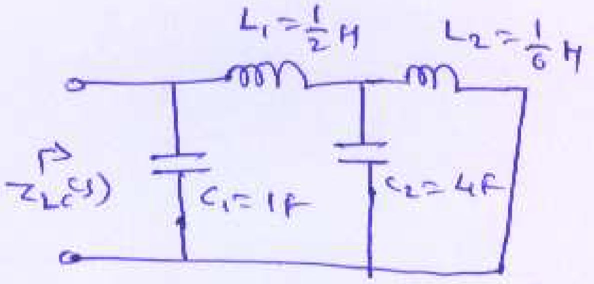
(Atleast four properties are required)

Q. 3(b) foster I form and Cauer I form

$$Z(s) = \frac{s^3+2s}{s^4+4s^2+3} = \frac{s(s^2+2)}{(s^2+1)(s^2+3)}$$



foster I form



Cauer-I form

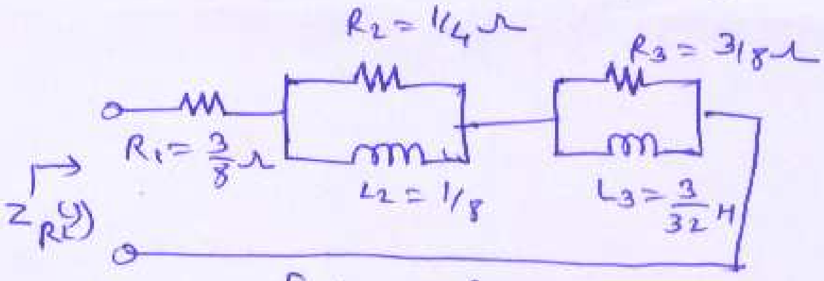
for foster I form – (4M)

& for Cauer I form - (4M)

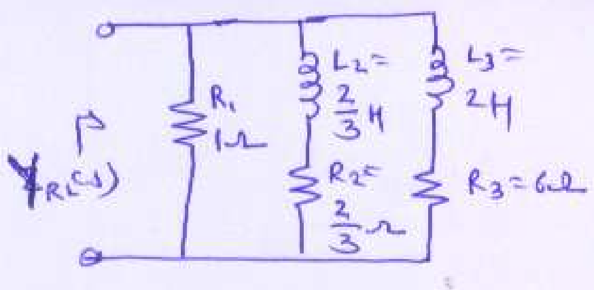
OR

Q. 4(a) foster I form and foster II form (3 marks each)

$$Z(s) = \frac{(s+1)(s+3)}{(s+2)(s+4)}$$



foster-I form



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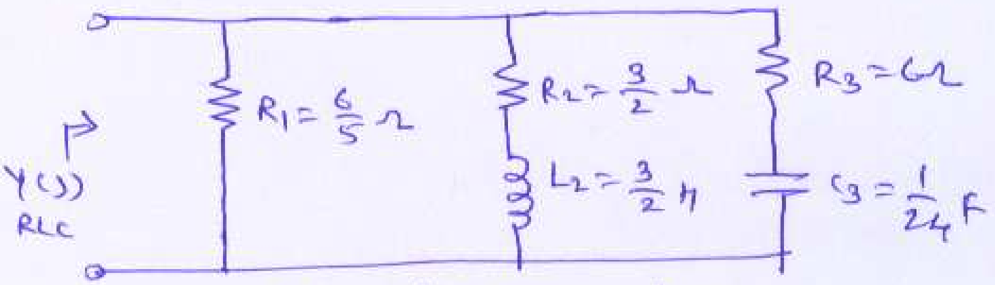
Q 4 (b)

$$Y(s) = \frac{(s+2)(s+3)}{(s+1)(s+4)}$$ (Total 4M)

$$Y(s) = \frac{5}{6} + \frac{1}{\frac{3}{2}s + \frac{3}{2}} + \frac{1}{6 + \frac{1}{\left(\frac{1}{24}\right)s}}$$ — (2M)

$$= Y_1(s) + Y_2(s) + Y_3(s)$$



— (2M)

RLC admittance fun^n.

Q. 5 (a) Defination of ZOT — (1M)

$$Z_{21} = \frac{2}{s^3+4s} \quad \& \quad Z_{22} = \frac{3s^2+2}{s^3+4s}$$ — (1M)

3 ZOT at $s = \infty$

Continued fraction expansion of $Y_{22}(s)$ — (3M)

find n/w with component values — (1M)