Roll No.:.....

National Institute of Technology, Delhi

Name of the Examination: B. Tech.

Branch	**: EEE/ECE**	**Semester**	**:3rd**
Title of the Course	**:Network analysis and synthesis**	**Course Code**	**:EEL 201**

Time: 3 Hours **Maximum Marks: 50**

Section A (Answer all questions)

10×1=10

1. (i) According to Millman's theorem, if there are n voltage source with n internal resistances respectively, are in parallel the value of equivalent voltage is _____.

(ii) Draw the pole zero diagram of given function

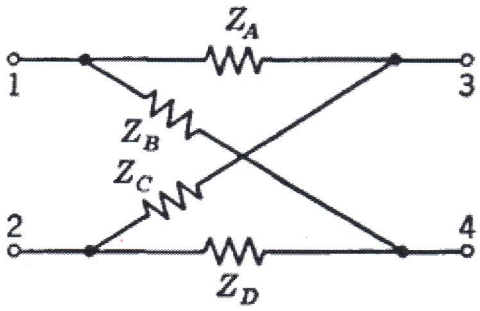
$$F(s) = \frac{2s+1}{(s-1)(s^2-8s+15)}$$

(iii) State the reciprocity theorem.

(iv) Draw complete phasor diagram of voltages and currents in star connection.

(v) Power in 3ph balanced system is measured by two wattmeter method. The load is operating at 0.5 lagging power factor. What will be the reading of 2 wattmeters?

(vi) Find the Z parameter of the following lattice network.



(vii) What are the possible locations of poles for pure L-C network?

(viii) Check the polynomial is Hurwitz or not

$$s^4 + s^3 + 2s^2 + 3s + 2$$

(ix) What are the condition for reciprocity and symmetry for ABCD parameter?

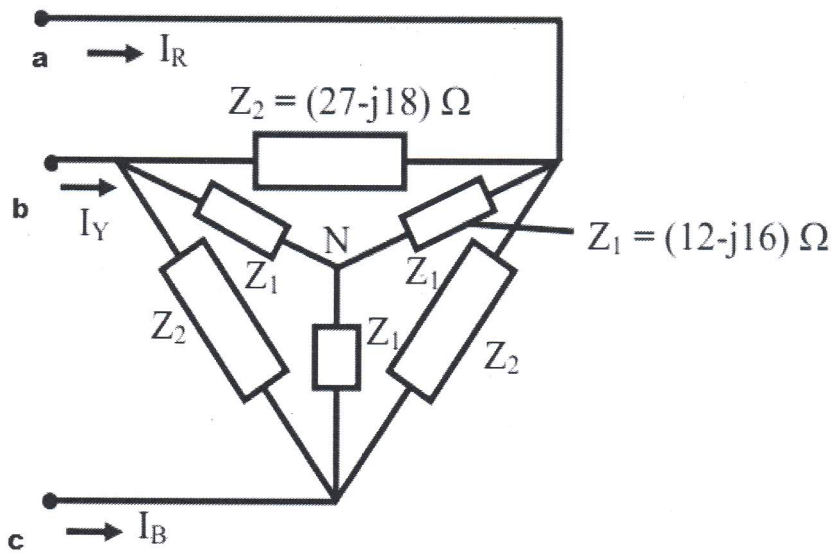
(x) If $F(s) = \frac{P(s)}{Q(s)} = \frac{M_1(s)+N_1(s)}{M_2(s)+N_2(s)}$, M being even part and N being odd part, then write the condition for positive realness of F(s).

Section B (Answer any four question)

4×5=20

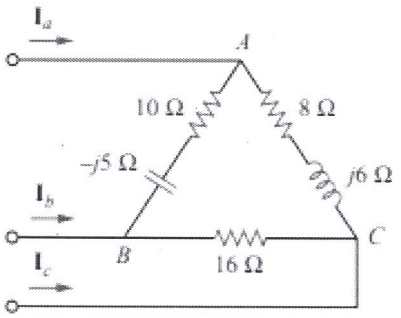
2. The star-connected load having impedance of (12-j16) Ω per phase is connected in parallel with the delta-connected load having impedance of (27+18 j) Ω per phase with both the loads being balanced, and fed from a three-phase, 230 V, balanced delta connected supply, with the phase sequence as RYB. Find the line current and power factor.

[5]



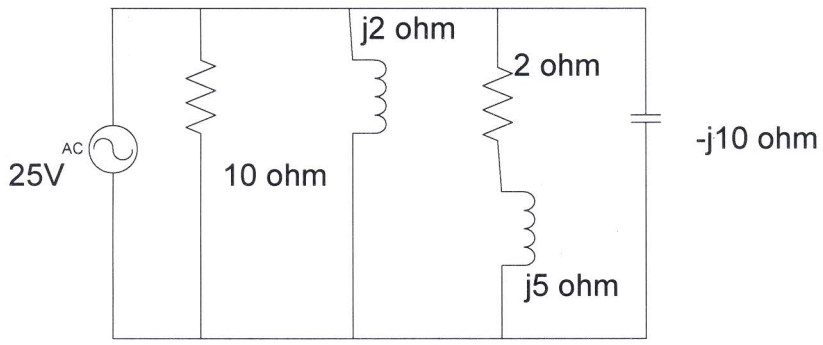
3. The unbalance delta load is supplied by Delta connected balanced voltage of 200V in positive sequence. Find the line currents and the total power drawn by the load.

[5]



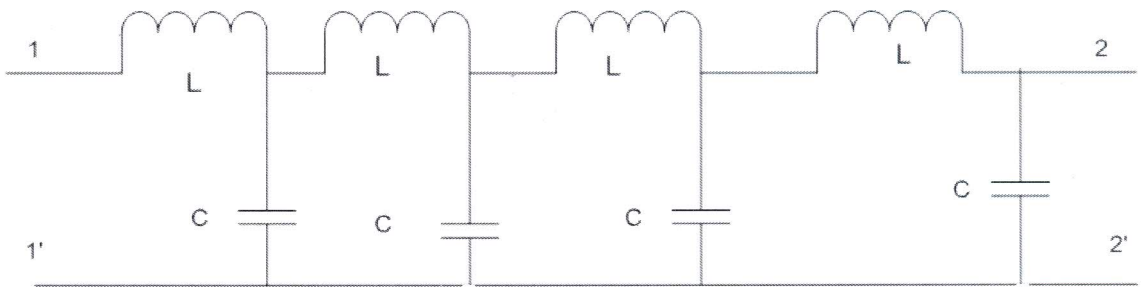
4. Find out the current through each branch of following network and hence comment on Tellegen's theorem.

[5]



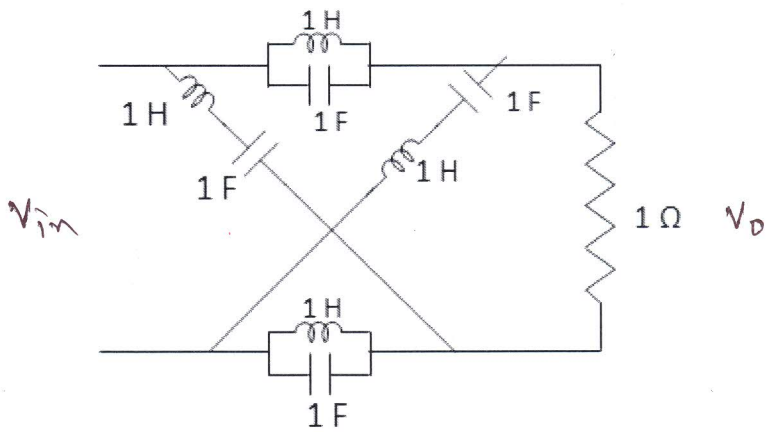
5. Find out transmission parameter of the following network.

[5]



6. Find out the voltage transfer function of given circuit.

[5]



Section C (Answer any two question)

10×2=20

7. The driving point functions of one port is given by

[10]

$$z(s) = \frac{8\,(s^2+4)(s^2+25)}{s(s^2+16)}$$

Synthesis the given function in Foster 1st and 2nd form.

8. Driving point function is given by

[10]

$$F(s) = \frac{s^2+6s+8}{s^2+4s+3}$$

Synthesis the function in Cauer 1st and 2nd method.

9. a. Find the limits of K so that the following polynomial is a Hurwitz

[5]

$$s^4 + 25s^3 + 15s^2 + 20s + K$$

b. What are the significance of positive real function and Hurwitz polynomial in network synthesis.

[5]

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