Roll No.....

National Institute of Technology Delhi

End Semester Examinations November 2016

Name of Specialization: EEE/ ECE
Course Name: Network Analysis & Synthesis
Course Code: EEL-201

Year: 2nd/ Semester: III
Maximum Marks – 50
Total Time: 3:00 Hours

Note:

- All Questions are compulsory.
- Assume data where ever required.

Section A (*01 mark each and all parts are compulsory*)

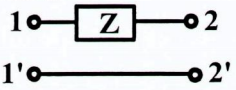
Q1) Draw the pole-zero diagram for the network function (1)

$$Z(s) = \frac{(5s+4)}{(s-1)(s^2+2s+4)}$$

Q2) What is the condition of reciprocity for T and g parameters. (1)

Q3) Express ABCD parameters in terms of h parameters. (1)

Q4) Find the y and z parameters for the network shown . (1)



Q5) Derive the relationship between line current and phase current for delta connection. (1)

Q6) Power in a balanced 3-phase system is measured by the two-wattmeter method and it is found that the ratio of the two readings is 2:1. What is the power factor of the system? (1)

Q7) Maximum power transfer occurs at a

(a) 100% efficiency (b) 50% efficiency (c) 25% efficiency (d) 75% efficiency (1)

Q8) State compensation theorem. (1)

Q9) Write the expression for Millman's equivalent source of *n* number of parallel connected sources. (1)

Q10) An L-C impedance or admittance function (1)

(a) has simple poles and zeros in the left half of s-plane (b) has no zero or pole at the origin or infinity

(c) is an odd rational function (d) has all poles on the negative real axis of the s-plane

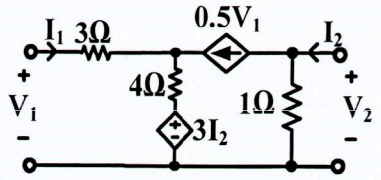
Section B (*Any four (04) are to be attempted*)

Q11) Two networks have general ABCD parameters as shown:

Parameter	Network-1	Network-2
A	1.50	5/3
B	11Ω	4Ω
C	0.25 siemens	1 siemens
D	2.5	3.0

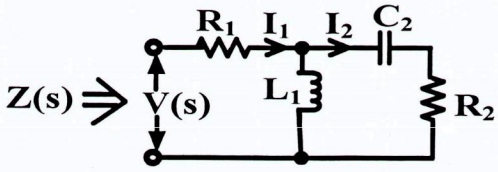
If the two networks are connected with their inputs and outputs in parallel, obtain the admittance matrix of the resulting network. (5)

Q12) Determine the *h*-parameters for the network shown (5)

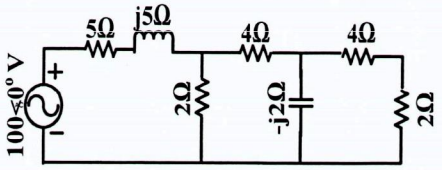


Q13) How the power factor of 3-phase balanced load can be determined using two wattmeter method. Discuss the effects of power factor on wattmeter reading when measuring 3-phase power using two wattmeter method. (5)

Q14) Write down the driving point impedance Z (s) of the network shown, locate the poles & zeros of Z (s) on the s-plane. If $V(t) = e^{-5t}$ is applied to the network at t = 0, calculate $I_2(t)$, while $R_1 = R_2 = 1\Omega$, $L_1 = ½$ H & $C_2 = ½$ F.(5)



Q15) In the circuit shown, determine the branch currents and voltages and hence verify Tellegen's theorem.



(5)

Section C (*Any two (02) are to be attempted*)

Q16) For a given function, determine Foster Form-I & II. (10)

$$Z(s) = \frac{(s+1)(s+3)(s+5)}{s(s+2)(s+4)(s+6)}$$

Q17) Find Cauer form-I & II of the following (10)

$$Z(s) = \frac{s(s^2+3)(s^2+5)}{(s^2+2)(s^2+4)}$$

Q18) (a) Find the limits of K so that the polynomial $s^3+14s^2+56s+K$ may be Hurwitz. (5)

(b) What is PRF and explain its properties. (5)