

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 1252

Roll No.

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B.Tech.

(SEM. III) ODD SEMESTER THEORY
EXAMINATION 2013-14

NETWORK ANALYSIS AND SYNTHESIS

Time : 3 Hours

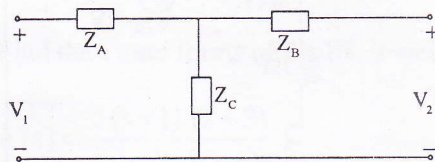
Total Marks : 100

Note :— Attempt all Sections.

SECTION-A

1. Attempt all the parts. Each part carries 2 marks : (10×2=20)

(a) Write the Z parameters for the given network.



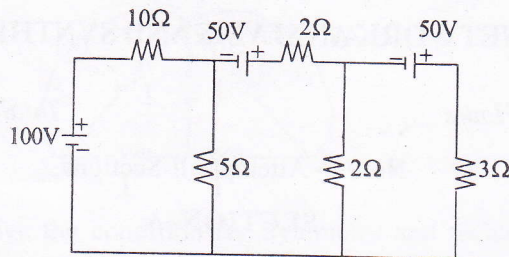
- (b) Write two properties of Complete Incidence matrix.
 (c) Define Planar Graph.
 (d) Write the equation for hybrid parameters.
 (e) Write Hybrid parameters in terms of Z parameters.
 (f) Define cascaded connection in two port network.
 (g) State reciprocity theorem.
 (h) State two properties of the R-L driving point Impedance function.

- (i) Define Lattice Network.
- (j) Write equation of inverse transmission parameters.

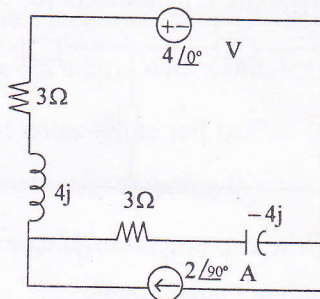
SECTION-B

Note :— Attempt any **three** parts of this question. Each part carries **10** marks : **(10×3=30)**

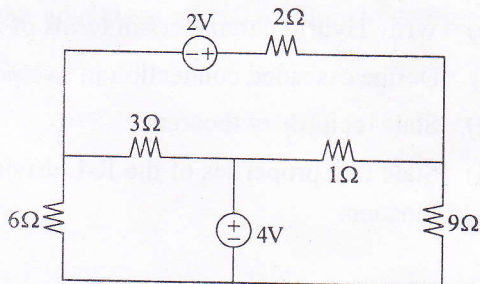
2. (a) Find current through 5Ω resistor using Thevenin's theorem.



- (b) Determine the current through capacitor C by the principle of Superposition.



- (c) State the Tellegen's theorem and verify it for the network shown.



- (d) Design a low pass filter both π and T network having a cut-off frequency of 1 KHz to operate with a terminated load resistance of 200Ω .
- (e) Draw the poles and zeros of the network function. Draw the pole-zero plot of the given network function and obtain $V(t)$ with the help of pole-zero plot.

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

SECTION-C

Note :— Attempt **all** the questions of this Section. Each question carries **10** marks : **(10×5=50)**

3. Test whether the polynomial $P(s)$ is Hurwitz or not.

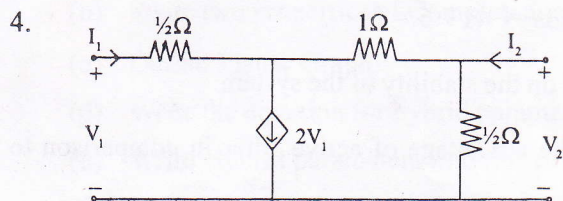
(i) $s^5 + 3s^2 + 2s$

(ii) $s^4 + 5s^3 + 5s^2 + 4s + 10$.

OR

Find the Cauer forms of the RL impedance functions

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



Find Y and Z parameters of the network.

OR

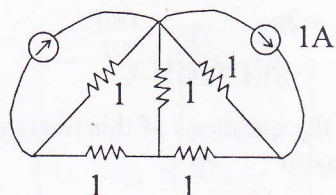
What are poles and zeros ? How does the location of the poles in the s-plane affect the system stability ? Explain.

5. Explain in detail with diagram the inter-connection of two-port networks.

OR

For the given network draw oriented graph. Write the tie-set schedule and hence obtain the equilibrium equation on loop basis.

Calculate the values of branch current.



6. (a) Derive the condition for Symmetry and reciprocity for Z parameters.
- (b) Explain the augmented incidence matrix, reduced incidence matrix and basic tie-set matrix with a suitable example.
7. (a) Find the number of poles in the left half of s-plane for a system whose characteristic equation is :

$$s^4 + 2s^3 + 3s^2 + 4s + 5 = 0$$

Comment on the stability of the system.

- (b) Explain the advantage of active filter in comparison to passive filter.