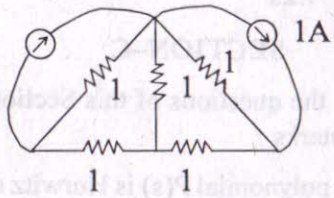
5. Explain in detail with diagram the inter-connection of two-port networks.

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.

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

PAPER ID : 1252 **Roll No.**

B.Tech.

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

NETWORK ANALYSIS AND SYNTHESIS

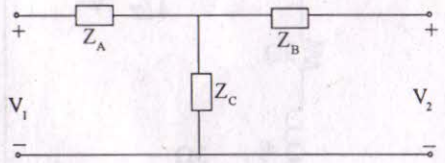
Time : 3 Hours *Total Marks : 100*

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.

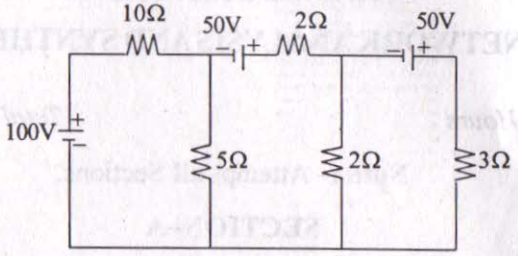
(i) Define Lattice Network.

(j) Write equation of inverse transmission parameters.

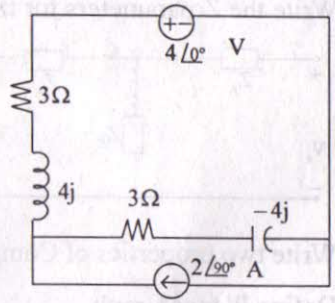
SECTION–B

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

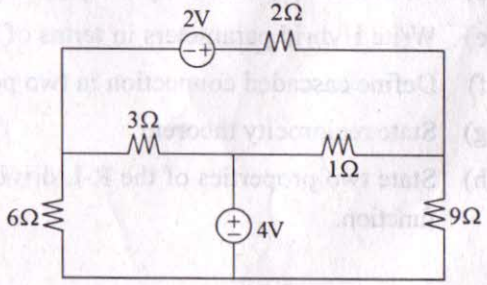
2. (a) Find current through 5Ω resistor using Thevenin's theorem.



(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 200 Ω.

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

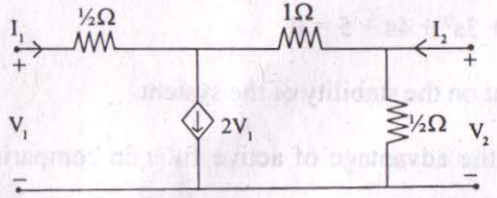
(ii) $s^4 + 5s^3 + 5s^2 + 4s + 10$.

OR

Find the Cauer forms of the RL impedance functions

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

4.



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.