

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

PAPER ID : 2044

Roll No.

--	--	--	--	--	--	--	--	--	--

**B. Tech.**

(SEM. III) ODD SEMESTER THEORY EXAMINATION  
2010-11

**NETWORKS ANALYSIS AND SYNTHESIS**

Time : 3 Hours

Total Marks : 100

**Note :** Attempt **all** the questions.1. Attempt any **three** of the following :

(a) Define the following :

6

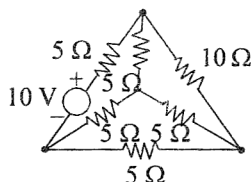
(i) Connected graph

(ii) Path

(iii) Tree

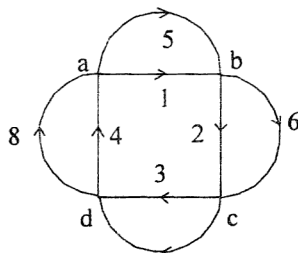
(iv) Links.

(b) For the network shown write the tie-set Matrix and determine the loop current and the branch currents. 6

**Figure 1**

(c) For the graph shown in figure 2, find the cut-set schedule.

6

**Figure 2**

(a) Show that the graph shown in figure 3 is isomorphic. 6

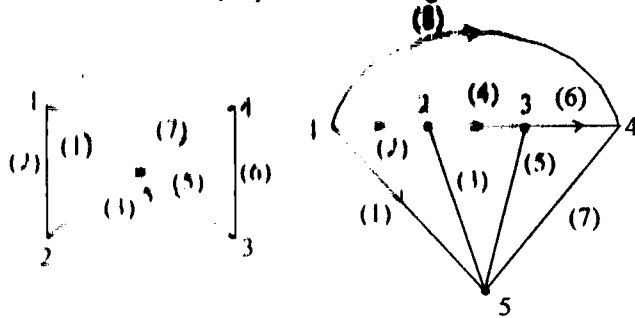


Figure 3

2. Attempt any **three** parts of the following :

- (a) (i) Write the super position theorem.  
 (ii) For the network shown determine Thevenin's equivalent source and the series impedance.

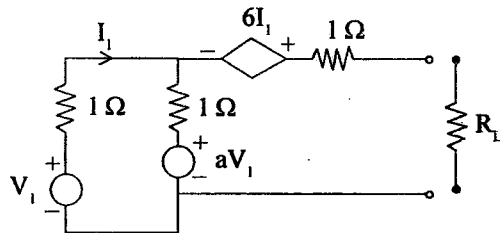


Figure 4

- (b) Verify Tellegen theorem for the pair of networks shown. Select suitable values in the two circuits.

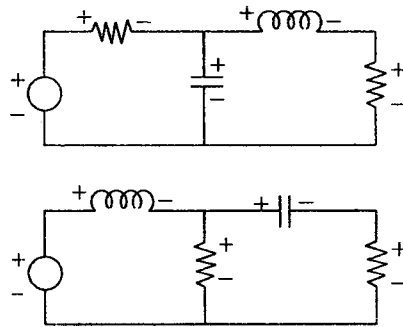


Figure 5

- (c) Write the statement of maximum power transfer theorem and also prove that maximum power can be transferred if load is complex conjugate of internal impedance. 7  
 (d) Determine  $X_1$  and  $X_2$  in terms of  $R_1$  and  $R_2$  to give maximum power dissipation in  $R_2$ . 7

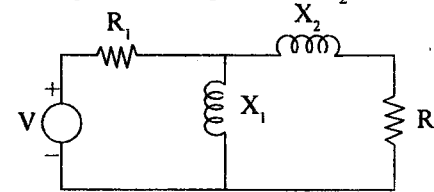


Figure 6

3. Attempt any **two** parts of the following :

- (a) Construct the Bode plot for the following transfer functions :

$$G(s) = \frac{10(s+10)}{s(s+5)(s+2)} \quad 10$$

- (b) Test whether the system represented by following characteristic equation is stable or not :

$$2s^4 + s^3 + 3s^2 + 5s + 10 = 0. \quad 10$$

- (c) For the given L-C network find the transform impedance  $Z(s)$ . 10

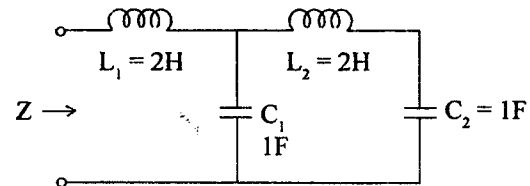


Figure 7

4. Attempt any **two** parts of the following :

- (a) Derive the condition for reciprocity and symmetry in case of (a) h-parameters, (b) Y-parameters. 10

- (b) Find the  $Z_{11}(s)$  and  $Z_{22}(s)$  parameters for the given bridged-T R-C network. 10

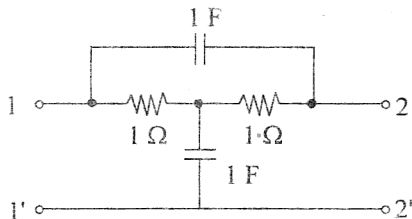


Figure 8

- (c) Obtain the transmission parameters in term of Z-parameters and Y-parameters. 10

5. Attempt any **two** parts of the following :

- (a) An impedance function is given by :

$$Z(s) = \frac{(s+1)(s+5)}{s(s+3)(s+7)},$$

find the R-C representation of foster-I and II forms. 10½

- (b) For the constant-k, low pass filter, derive/find out the two cutoff frequencies.
- (c) Find the driving point impedance as a quotient of polynomials for the given network. 10½

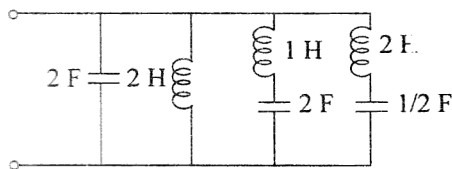


Figure 9