(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

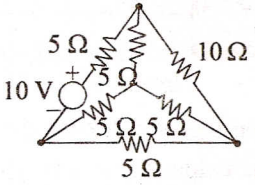

Figure 1

(c) For the graph shown in figure 2, find the cut-set schedule. 6

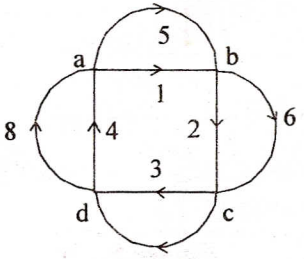

Figure 2

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

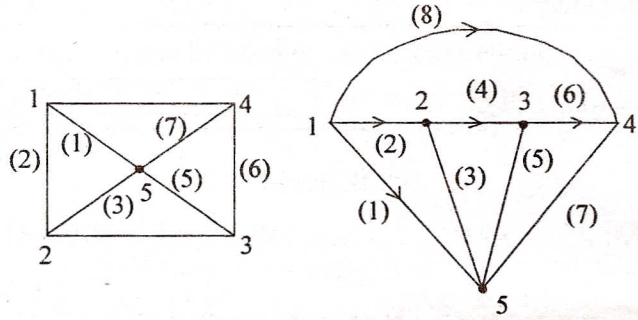

Figure 3

2. Attempt any **three** parts of the following : 7

(a) (i) Write the super position theorem.

(ii) For the network shown determine Thevenin's equivalent source and the series impedance.

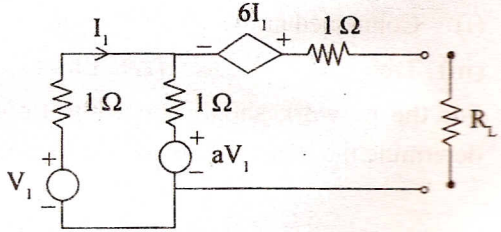

Figure 4

(b) Verify Tellegen theorem for the pair of networks shown. Select suitable values in the two circuits. 7

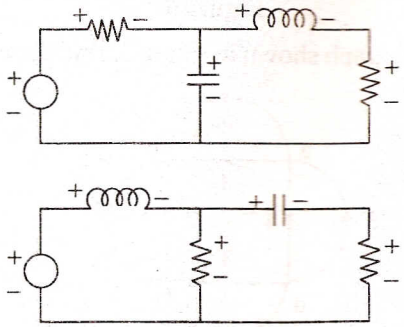

Figure 5

(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 is terms of R_1 and R_2 to give maximum power dissipation in R_2. 7

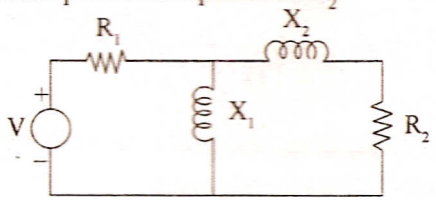

Figure 6

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

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

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

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

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

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

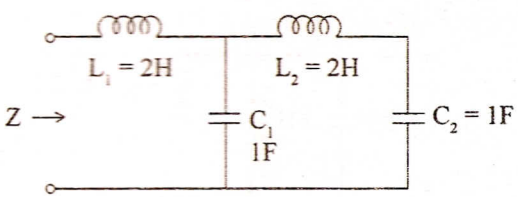

Figure 7

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

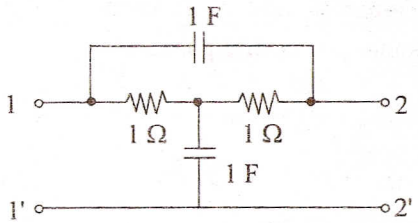

Figure 8

(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

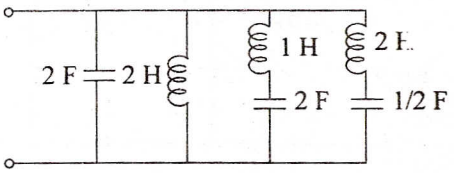

Figure 9