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

PAPER ID : 2052 Roll No. | | | | | | | | | |

B.Tech.

(SEM IV) EVEN SEMESTER THEORY EXAMINATION, 2009-2010

NETWORK ANALYSIS AND SYNTHESIS

Time : 3 Hours *Total Marks : 100*

Note : *Attempt all questions.*

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

   (a) Explain the augmented incidence Matrix, reduced incidence Matrix, basic tie-set Matrix taking a suitable example. **10**

   (b) For the network shown in fig. (1), write down the basic tie-set Matrix and obtain the network equilibrium equation in Matrix form using KVL. Calculate the loop currents and branch voltages. **10**

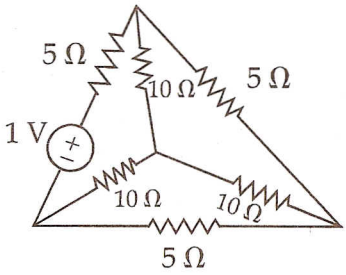

Figure - 1

(c) Explain the concept of duality. Draw the dual of the network shown below in fig. (2). Write the KVL equations of the network of fig.(2) and KCL equations of the dual network and prove that the two sets of equations are same except for the currents and voltages assumed. **10**

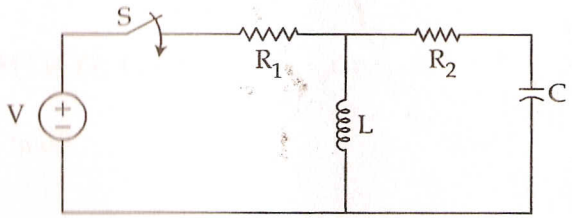

Figure - 2

2. Attempt **any two** parts :

(a) State and prove the tellegen's theorem. Verify the tellegen theorem for the network shown in fig. (3). **10**

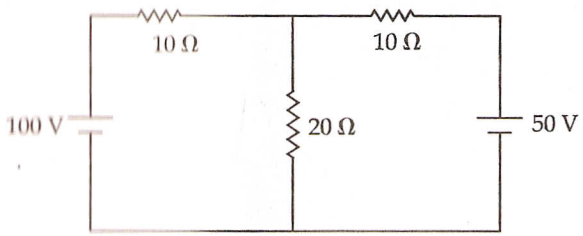

Figure - 3

(b) Find the thevenin's equivalent for the network shown in fig. (4) across the terminals a-b. **10**

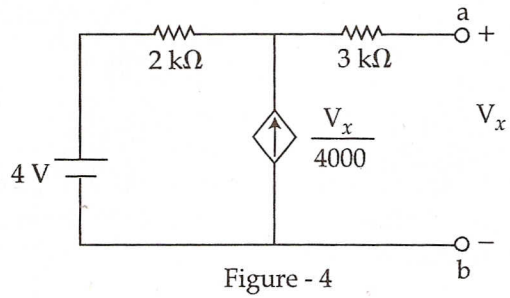

Figure - 4

(c) In the network shown in the figure (5) below, the resistance R is changed from 4Ω to 2Ω. Verify the compensation theorem **10**

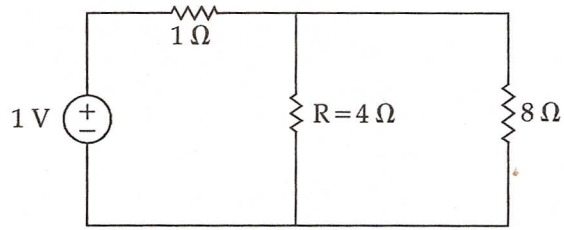

Figure - 5

3. Attempt **any two** parts :

(a) Enlist the necessary conditions for transfer functions and driving point functions. **10**

(d) Find the Y parameters for the resistive network shown below in figure (7) : 5

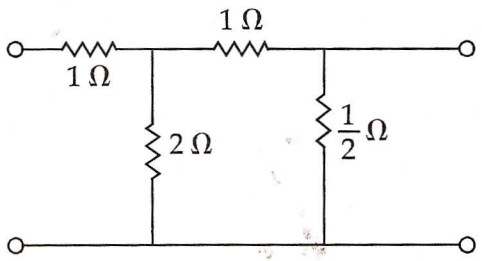

Figure - 7

(e) Find the 'h' parameters of the network shown below in figure (8). 5

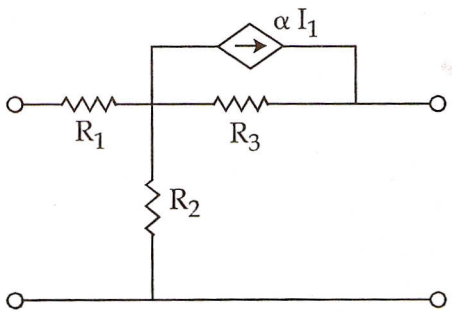

Figure - 8

(f) Find the 'Z' parameters of the lattice network shown below in figure (9) : 5

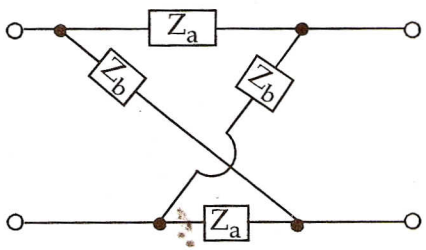

Figure - 9

5. Attempt **any two** parts :

(a) Find the Foster I and II forms of realization of the given driving - point impedance function 10

$$Z(S) = \frac{4(S^2 + 1)(S^2 + 9)}{S(S^2 + 4)}$$

(b) List the properties of R-L, R-C and L-C functions. Find the cover II realization of the following driving-point impedance function 10

$$Z(S) = \frac{2(S + 1)(S + 3)}{(S + 2)(S + 4)}$$

(c) Design constant K low pass T and Π section filters to be terminated in 600Ω, having cut-off frequency 3 kHZ. Determine : 10

(i) the frequency at which the filters offer attenuation of 17.372 dB.

(ii) attenuation at 6 kHZ.

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