4 Attempt any **two** parts : **10×2=20**

(a) Explain the concepts of reciprocity and symmetry. Derive the above conditions for h and ABCD parameters.

(b)

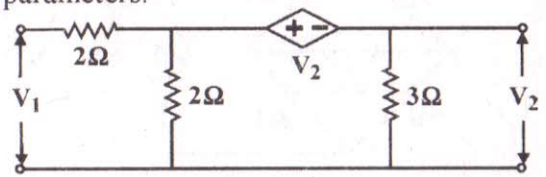

Fig. 8

Find the Y and Z parameters of the network in **fig. 8**.

(c) Find the h parameters of the network shown in **fig. 9**.

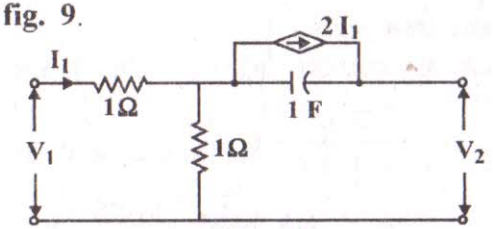

Fig. 9

5 Answer any **two** parts : **10×2=20**

(a) Define positive real function and mention its properties. Also write the properties of RL, RC and LC driving point functions.

(b) Synthesize the Foster I and II forms of realization of the following driving point function

$$Z_0(s) = \frac{2s^2 + 12s + 16}{s^2 + 4s + 3}.$$

(c) Design constant - K low pass T and π section filters to be terminated in 600 Ω having cut-off frequency 3 kHz.

Printed Pages : 4 TEE303

(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 2009-10

NETWORK ANALYSIS & SYNTHESIS

Time : 3 Hours] *[Total Marks : 100*

Note : *Attempt **all** questions. All questions carry **equal** marks. In case of numerical problems make suitable assumptions wherever required.*

1 Attempt any **four** parts : **5×4=20**

(a) Define tree, co-tree, twig, link and incidence matrix taking a suitable example.

(b) Explain the fundamental cut-set matrix taking a suitable example.

(c) Derive the relationship between fundamental tie-set matrix, impedance matrix, loop current matrix and loop emf matrix.

(d) For the network shown in the **fig. 1** below, write down the tie-set matrix.

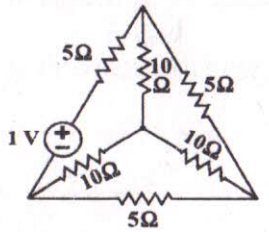

Fig. 1

(e) Explain the concept of duality. What relationship has duality with the incidence matrix ?

(f) Find the dual of the following network shown in **fig. 2**.

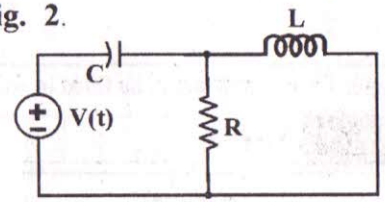

Fig. 2

2 Attempt any **four** parts : **5×4=20**

(a) Find the current in the $(1 + j\,1)\,\Omega$ resistor across A, B of the network shown in **fig. 3** using thevenins theorem.

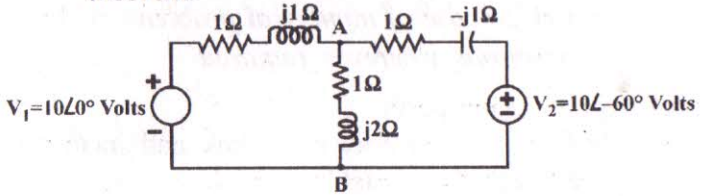

Fig. 3

(b) Obtain the Thevenin's equivalent circuit for the network shown in **fig. 4**.

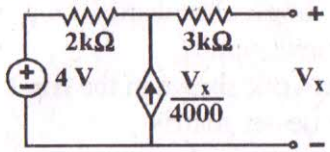

Fig. 4

(c) Verify Tellegen's theorem for the network shown in **fig. 5**.

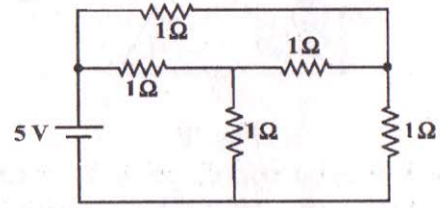

Fig. 5

(d) Find the power delivered by the two sources to the circuit shown in **fig. 6**.

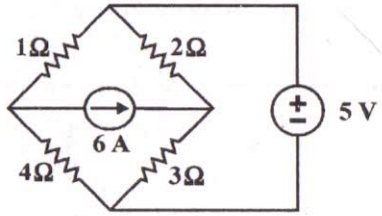

Fig. 6

(e) State and prove the Maximum power transfer theorem for AC circuits.

(f) State and prove Millman's theorem.

3 Answer any **two** parts : **10×2=20**

(a) Transform current I(s) of a network is given by $I(s)=\dfrac{2s}{(s+1)(s+2)}$. Plot the poles and zeros in the s-plane and hence obtain time-domain response of it.

(b) Explain the complete procedure for making a Bode Plot for different types of transfer function.

(c) Show that the voltage transfer function of the network shown in fig. 7 can be written as

$$\frac{V_2(S)}{V_1(S)}=\frac{1}{R_1C_2}\,\frac{S}{S^2+\dfrac{R_1C_1+R_2(C_1+C_2)}{R_1R_2C_1C_2}+\dfrac{1}{R_1R_2C_1C_2}}.$$

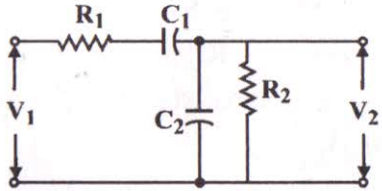

Fig. 7