*1214 *

B.Tech. (Semester-IV)

SPL. THEORY EXAMINATION, 2014-15

NETWORK ANALYSIS AND SYNTHESIS

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

Note: Attempt all questions. All questions carry equal marks.

1. Attempt any four parts of the following: (5×4=20)

a) Define with suitable example: (i) Planar graph (ii) Incidence matrix (iii) Twigs (iv) Chord.

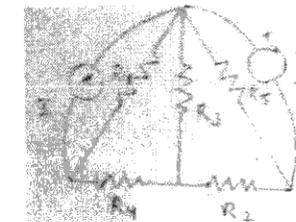b) Draw the oriented graph of network given in fig1. & write the incidence & reduced incidence matrix.

Fig. 1

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5. Attempt any two parts of the following: (10×2=20)

a) What is the difference between active and passive filters? Design a constant K type band pass filter section to be terminated in 600 Ω resistance having cut-off frequencies of 2 kHz and 5 kHz.

b) Check whether the given function is positive real or not.

$$(s^3+5s^2+9s+3)/(s^3+4s^2+7s+9)$$

c) Define low pass, high pass, and band –elimination filters with the help of their attenuation characteristics.

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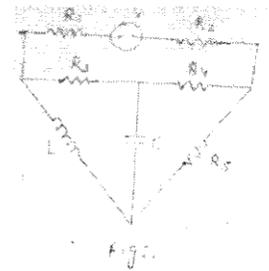
c) Write the principle of duality & draw the dual of the network given below.

Fig.

d) List out the various properties of complete incidence matrix.

e) Show that f-cutset and f-loop matrix is orthogonal to each other.

f) Define the term: Tree, Co-tree and link.

2. Attempt any two parts of the following: (10×2=20)

a) State and prove maximum power transfer theorem for A.C circuits.

b) State Millman's theorem and compensation theorem with a suitable example.

c) State tellegen's theorem. Find the value of source E_2 using tellegen's theorem if the power absorbed by E_2 is 120 W in fig below.

Fig-6.
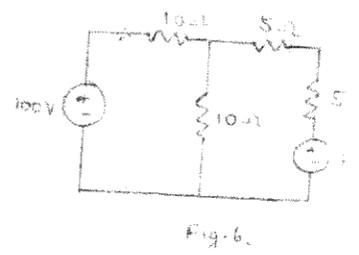
3. Attempt any two parts of the following: (10×2=20)

a) (i) Explain the concept of complex frequency.

(ii) Explain the concept of poles and zeros of a network function.

b) (i) Calculate the range of K for which the system is given by the characteristics equation.

$$S^3 +7S^2+10S+K=0$$

(ii) Check the stability of the system with characteristics equation.

$$S^5+4S^4+8S^3+8S^2+7S+4=0$$

c) Find the driving point impedance impedance of the network shown in fig below. Fine the pole and zero of the network and locate them in the s-plane.

4. Attempt any two parts of the following: (10×2=20)

a) The ABCD parameters of a two port n/w are A=2, B=5, C=1/3, D=4/3. Determine z, y & h- Parameters.

b) Obtain the Z-parameters of the network in terms of T-parameters.

c) Show that the overall transmission parameter matrix for cascade two 2-port networks is simply the matrix product of transmission parameters for each individual 2-port network in cascade.