

B.TECH. - VIEP-ELECTRICAL ENGINEERING

Term-End Examination

December, 2012

BIEE-014 : NETWORK THEORY

Time : 3 hours

Maximum Marks : 70

- Note : (i) Attempt **any five** questions.
(ii) All questions carry **equal** marks.

1. (a) For the network shown in fig - 1 draw network graph. Select 2, 4, 5 as tree branches. Obtain loop incidence matrix and loop equations. 7

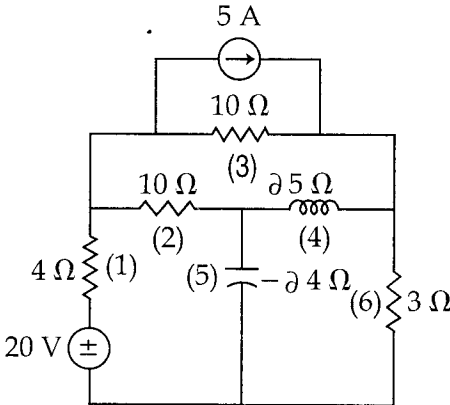


Fig. 1

- (b) Explain the concept of quality with the help of suitable example. 7

2. (a) State and prove maximum power transfer theorem for an ac network. 7
- (b) For the circuit shown in fig - 2 obtain the voltage across each current source using super position Theorem. 7

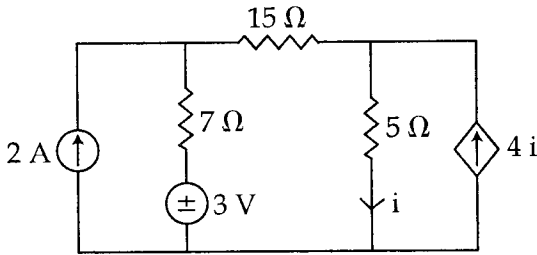


Fig. 2

3. (a) Apply Routh criterion to given polynomial and determine the number of roots 7
- (i) with the real parts
- (ii) with zero real parts
- (iii) with negative real parts

$$Q(s) = s^4 + 4s^3 + 8s^2 + 12s + 15$$

- (b) Plot the poles and Zeros of 7

$$H(s) = \frac{2s}{s^2 + 4s + 8}$$

and use it to find the magnitude and phase for $\omega = 0, 1, 3$

4. (a) Two identical section of network as shown in fig - 3 are connected in parallel. Obtain the Y parameters of the combinations. 7

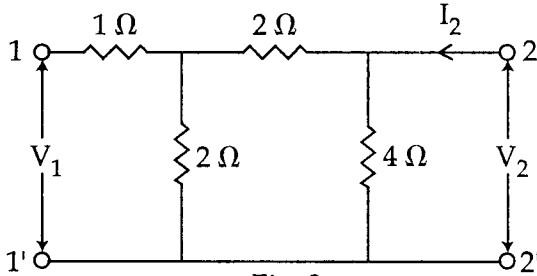


Fig. 3

- (b) The z parameters of a two port network are $z_{11} = 10 \Omega$, $z_{22} = 15 \Omega$, $z_{12} = z_{21} = 5 \Omega$. Find the equivalent T network and ABCD parameters. 7
5. (a) The Driving point impedance of a one port reactive network is given by. 7

$$z(s) = \frac{5(s^2 + 4)(s^2 + 25)}{s(s^2 + 16)}$$

obtain Foster first form network.

- (b) The driving point impedance of an LC network is given by 7

$$z(s) = \frac{2s^5 + 12s^3 + 16s}{s^4 + 4s^2 + 3}$$

Determine the first Cauer form of network.

6. (a) Design a Low pass filter (both IT and T - sections) having cut off frequency of 2 kHz to operate with terminal local resistance of 500Ω . 7
- (b) Derive the characteristics of constant K high pass filter. 7
7. Write short notes on *any three* of the following. 5, 5, 4
- (a) Properties of driving point and transfer functions.
- (b) Routh Hurwitz stability criterion
- (c) Tellegen's Theorem
- (d) Positive real functions.
-