No. of Printed Pages : 4

BIEE-014

B.Tech. – VIEP – ELECTRICAL ENGINEERING (BTELVI)

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Term-End Examination

June, 2014

BIEE-014 : NETWORK THEORY

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any* ***seven*** *questions. All questions carry equal marks.*

1. (a) Find the Cauer-I form of RC network.

$$z(s) = \frac{(s+3)(s+6)}{(s+1)(s+5)}$$

(b) State and prove the maximum power transfer theorem with suitable example and state the maximum efficiency. *5×2=10*

2. (a) Describe the relationship between twigs and links and also write the properties of a tree in a network.

(b) Determine the voltage ratio transfer function $V_0(s) / V_i(s)$ for a ladder network shown in Fig. 1.

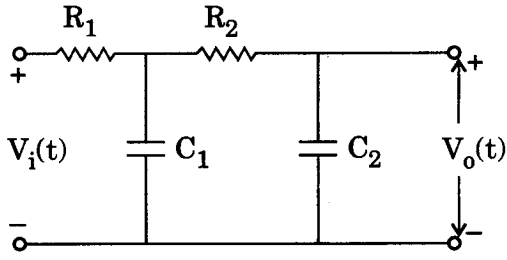

Fig. 1 *5×2=10*

3. (a) Describe the graphical method to determine the frequency response from the pole-zero plot.

(b) Given a simple circuit of a K-type band pass filter; show that its resonance frequency is the geometric mean of the cut-off frequencies. *5×2=10*

4. (a) Establish the conditions of (i) symmetry, (ii) reciprocity in terms of ABCD parameters of a linear, passive two-port network.

(b) Find the z-parameters of the two-port network shown in Fig. 2. Hence prove that the y-parameters of this network do not exist.

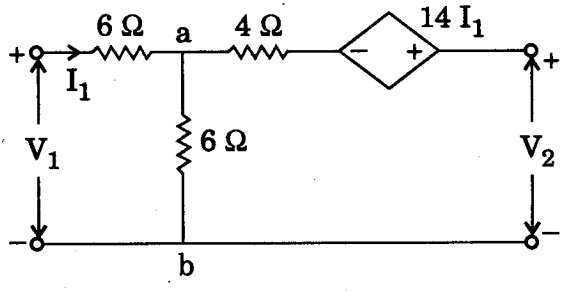

Fig. 2 *5×2=10*

5. State and prove the Superposition theorem with the help of suitable examples and also write its limitations. *10*

6. State and explain the Millman's theorem and also find the current in load Z_L shown in Fig. 3. *10*

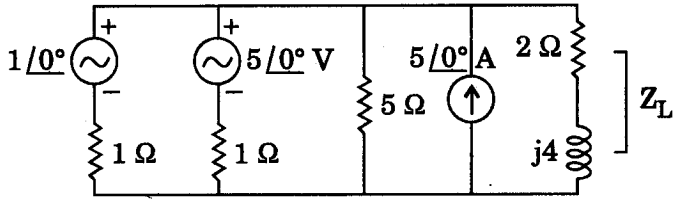

Fig. 3

7. Draw the oriented graph of the network shown in Fig. 4 and write the incidence matrix by inspection. *4+6=10*

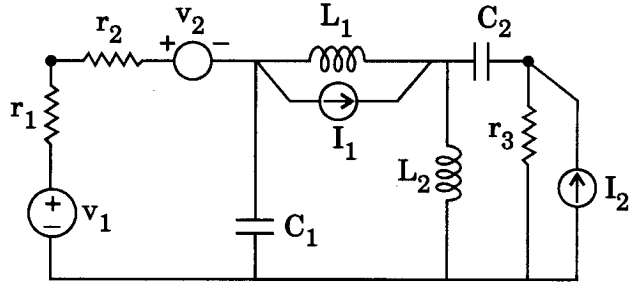

Fig. 4

8. Plot the pole and zeros of $H(s) = \frac{4s}{s^2 + 2s + 2}$ and use it to plot magnitude and phase characteristics for w = 0, 1, 1·5, 3 and 5. *10*

9. Design a band pass constant K filter with cut-off frequency of 3 kHz and 6 kHz and nominal characteristics impedance of 600 Ω. *10*

10. Explain with illustrative examples the meaning of the following terms : *10*

    (i) Incidence matrix

    (ii) Cut-set matrix

    (iii) Fundamental loop matrix