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

Term-End Examination

00866

June, 2015

BIEE-014 : NETWORK THEORY

Time : 3 hours   *Maximum Marks : 70*

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

1. (a)   (i)   What is the difference between cut-set and fundamental cut-set matrix ?

    (ii) Explain the procedure of f-cut-set matrix.   7

    (b)   (i)   State the properties of incidence matrix.

    (ii) Draw the reduced incidence matrix of the directed graph shown in the figure.   7
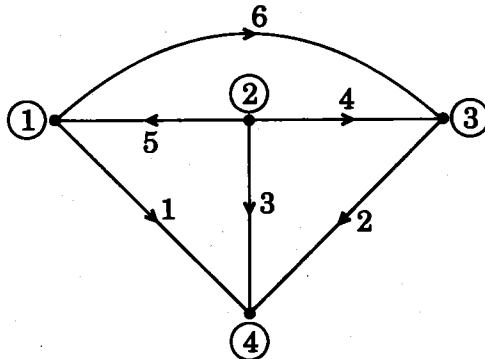
Figure 1

2. (a) (i) What is the difference between Thevenin's theorem and Norton's theorem ?

(ii) Find the Thevenin's equivalent for the network shown below across the terminals AB and hence find the source current.   7
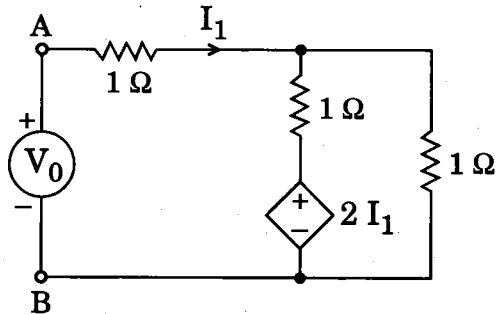
(b) State and prove Reciprocity theorem.   7

3. (a) The transfer function of a system is given by

$$G(s) = \frac{s^2 + 3}{s(s+4)(s^2+4)}.$$
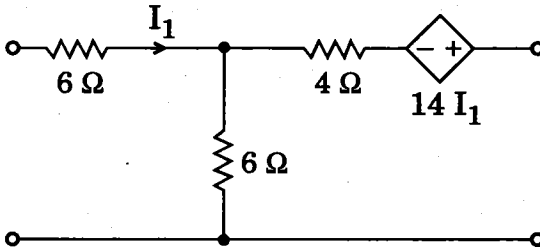
Determine the impulse response of the system.   7

(b) Define stability. Determine the stability of a system having the following characteristic equation :   7

$$s^6 + s^5 + 5s^4 + 3s^3 + 2s^2 - 4s - 8 = 0.$$

4. (a) Find the z-parameters of the network shown in the figure. Hence prove that y-parameters of this network do not exist. 7


(b) Why are h-parameters known as hybrid parameters ? Discuss the condition of symmetry and reciprocity for h-parameters. 7

5. (a) State the properties of driving point impedance of

(i) L-C network,

(ii) R-C network. 7

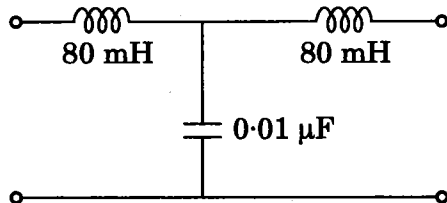(b) Find the first and second Cauer forms of L-C networks realizing the impedance function

$$Z(s) = \frac{s^4 + 10s^2 + 9}{s^3 + 4s}.$$ 7

6. (a) Find the image parameters of the network shown in the figure.   7
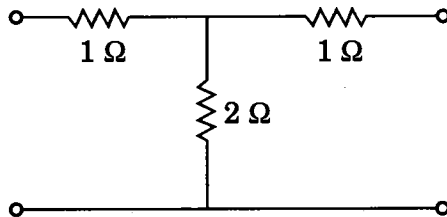
    (b) For the given T-section low pass filter, determine the cut-off frequency and normal characteristic impedance R_0.

        Derive the formulae used.   7

7. Write short notes on any *two* of the following :

                                          2×7=14

    (a) Tellegen Theorem

    (b) Transform Impedance Function

    (c) Ladder and Lattice Network

    (d) Foster-II form of Synthesizing Network

    (e) Advantages and Limitations of Active Filters

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