BIEE-014

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

## Term-End Examination

DO852

## December, 2017

## BIEE-014 : NETWORK THEORY

*Time : 3 hours*                    *Maximum Marks : 70*

*Note :* *Attempt five questions in all. All questions carry equal marks. Assume missing data suitably. Use of scientific calculator is allowed.*

1.  (a)  Define the concept of network graph in network graph theory.                    2

    (b)  Define the following terminologies used in a network graph with appropriate examples :                    4×3=12

        (i)  Branch

        (ii)  Node

        (iii)  Tree

        (iv)  Loop

**2.** (a) State and explain the Reciprocity theorem. 7

(b) State Thevenin's theorem. Derive the expression for Thevnin's resistance ($R_{th}$) and Thevenin's voltage ($V_{th}$) for a two-port network. 7

**3.** (a) State the Superposition theorem, and prove the theorem. 7

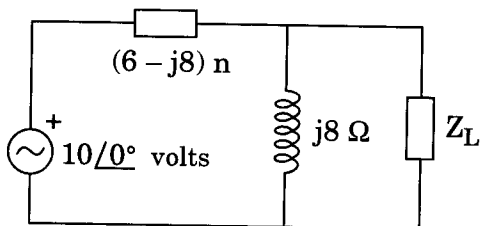(b) Find the load impedance in the following figure for maximum power to load. Find the amount of maximum power. 7



*Figure 1*

**4.** (a) What is Network Function ? Give the expressions for different transfer functions of a two-port network. 7

(b) Discuss the time domain behaviour of transfer function from pole-zero plot. 7

**5.** (a) Define the following terms : $2 \times 3\frac{1}{2} = 7$

(i) Linear and Non-linear elements

(ii) Active and Passive elements

(b) For a two-port network, derive the Z-parameters. 7

6. (a) Define the condition of reciprocity and symmetry in two-port parameter representation. 4

(b) For the h-parameter equivalent network (Figure 2), find the voltage gain. 10
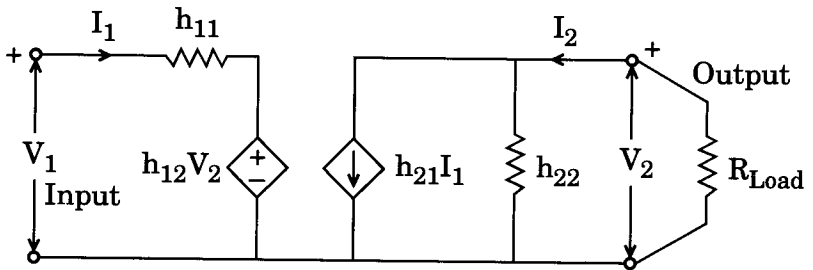


Figure 2

7. Explain in detail, any *two* of the following : 2×7=14

(a) Properties of Hurwitz Polynomial

(b) Analysis of Prototype Low Pass Filter

(c) Foster and Cauer Forms