

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

Term-End Examination

December, 2018

00453

BIEE-014 : NETWORK THEORY

Time : 3 hours

Maximum Marks : 70

Note : Attempt any five questions. All questions carry equal marks. Use of scientific calculator is allowed.

1. (a) Draw the oriented graph of the network shown in Figure 1 and write the incidence matrix. 10

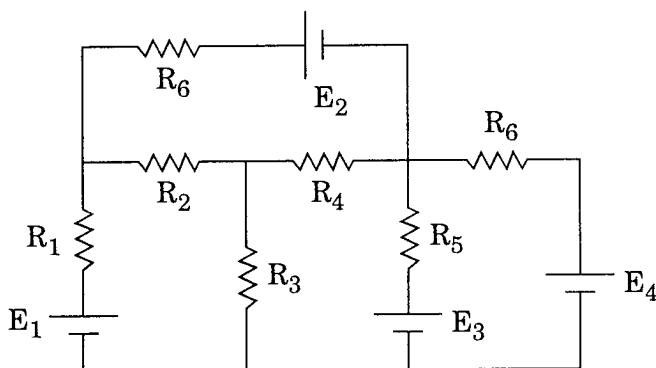


Figure 1

(b) Define the following terms with respect to network topology and give examples : 4

(i) Oriented and unoriented graph

(ii) Fundamental cut set

2. (a) State and explain the maximum power transfer theorem when load impedance is consisting of variable resistance and variable reactance. 10

(b) Determine the Thevenin equivalent circuit which may be used to represent the given network at the terminal A – B. 4

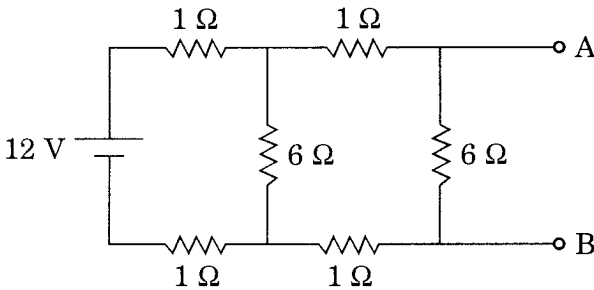


Figure 2

3. (a) Enlist the restrictions on location of poles and zeros in driving point function. 7

- (b) Determine the driving point impedance function of the network shown in Figure 3. 7

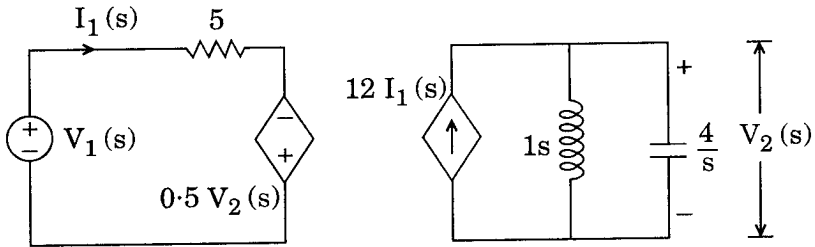


Figure 3

4. (a) Obtain the relationship between h and y -parameters of a two-port network. 7
- (b) The z -parameters of a two-port network are $z_{11} = 15$ ohms, $z_{22} = 25$ ohms, $z_{12} = z_{21} = 5$ ohms. Determine the ABCD parameters. 7
5. (a) Write the properties of Hurwitz's polynomials and positive real functions. 7
- (b) Test whether 7
- (i) The polynomial $F(s) = s^4 + 6s^3 + 2s^2 + s + 1$ is Hurwitz or not.
- (ii) The function $F(s) = \frac{s^3 + 4s^2 + 7s + 3}{s^3 + 3s^2 + 5s + 6}$ is positive real or not.

6. (a) Synthesize the function $z(s) = \frac{4(s+1)(s+3)}{s(s+2)}$ using the Cauer form-I of realization. 7

(b) Check whether the following functions are of RL, RC or LC types : 7

(i)
$$\frac{s^3 + 2s}{s^4 + 4s^2 + 3}$$

(ii)
$$\frac{s^2 + 8s + 15}{s^2 + 6s + 8}$$

7. Write short notes on any **two** of the following : $2 \times 7 = 14$

- (a) Compensation Theorem
 - (b) Advantages and Limitations of Active Filters
 - (c) Properties of Driving Point Function
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